SELECTED WATER RESOURCES ABSTRACTS

VOLUME 8, NUMBER 8
APRIL 15, 1975

W75-03851 -- W75-04350

SELECTED WATER RESOURCES ABSTRACTS is published semimonthly for the Water Resources Scientific Information Center (WRSIC) by the National Technical Information Service (NTIS), U.S. Department of Commerce. NTIS was established September 2, 1970, as a new primary operating unit under the Assistant Secretary of Commerce for Science and Technology to improve public access to the many products and services of the Department. Information services for Federal scientific and technical report literature previously provided by the Clearinghouse for Federal Scientific and Technical Information are now provided by NTIS.

SELECTED WATER RESOURCES ABSTRACTS is available to Federal agencies, contractors, or grantees in water resources upon request to: Manager, Water Resources Scientific Information Center, Office of Water Research and Technology, U.S. Department of the Interior, Washington, D. C. 20240.

SELECTED WATER RESOURCES ABSTRACTS is also available on subscription from the National Technical Information Service. Annual subscription rates are: To the SWRA Journal, $75 ($95 foreign); to the Journal & Annual Index, $100 ($125 foreign); to the Annual Index only, $50 ($65 foreign). Certain documents abstracted in this journal can be purchased from the NTIS at prices indicated in the entry. Prepayment is required.

SELECTED
WATER RESOURCES ABSTRACTS

A Semimonthly Publication of the Water Resources Scientific Information Center,
Office of Water Research and Technology, U.S. Department of the Interior

VOLUME 8, NUMBER 8
APRIL 15, 1975

W75-03851 -- W75-04350

The Secretary of the U. S. Department of the Interior has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through August 31, 1978.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

FOREWORD

Selected Water Resources Abstracts, a semimonthly journal, includes abstracts of current and earlier pertinent monographs, journal articles, reports, and other publication formats. The contents of these documents cover the water-related aspects of the life, physical, and social sciences as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water. Each abstract includes a full bibliographical citation and a set of descriptors or identifiers which are listed in the **Water Resources Thesaurus.** Each abstract entry is classified into ten fields and sixty groups similar to the water resources research categories established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

WRSIC IS NOT PRESENTLY IN A POSITION TO PROVIDE COPIES OF DOCUMENTS ABSTRACTED IN THIS JOURNAL. Sufficient bibliographic information is given to enable readers to order the desired documents from local libraries or other sources.

Selected Water Resources Abstracts is designed to serve the scientific and technical information needs of scientists, engineers, and managers as one of several planned services of the Water Resources Scientific Information Center (WRSIC). The Center was established by the Secretary of the Interior and has been designated by the Federal Council for Science and Technology to serve the water resources community by improving the communication of water-related research results. The Center is pursuing this objective by coordinating and supplementing the existing scientific and technical information activities associated with active research and investigation program in water resources.

To provide WRSIC with input, selected organizations with active water resources research programs are supported as "centers of competence" responsible for selecting, abstracting, and indexing from the current and earlier pertinent literature in specified subject areas.

Additional "centers of competence" have been established in cooperation with the Environmental Protection Agency. A directory of the Centers appears on inside back cover.

Supplementary documentation is being secured from established discipline-oriented abstracting and indexing services. Currently an arrangement is in effect whereby the BioScience Information Service of Biological Abstracts supplies WRSIC with relevant references from the several subject areas of interest to our users. In addition to Biological Abstracts, references are acquired from Bioresearch Index which are without abstracts and therefore also appear abstractless in SWRA. Similar arrangements with other producers of abstracts are contemplated as planned augmentation of the information base.

The input from these Centers, and from the 51 Water Resources Research Institutes administered under the Water Resources Research Act of 1964, as well as input from the grantees and contractors of the Office of Water Research and Technology and other Federal water resource agencies with which the

Center has agreements becomes the information base from which this journal is, and other information services will be, derived; these services include bibliographies, specialized indexes, literature searches, and state-of-the-art reviews.

Comments and suggestions concerning the contents and arrangements of this bulletin are welcome.

Water Resources Scientific Information Center
Office of Water Research and Technology
U.S. Department of the Interior
Washington, D. C. 20240

CONTENTS

FOREWORD iii

SUBJECT FIELDS AND GROUPS

(Use Edge Index on back cover to Locate Subject Fields and Indexes in the journal.)

01 NATURE OF WATER
Includes the following Groups: Properties; Aqueous Solutions and Suspensions

02 WATER CYCLE
Includes the following Groups: General; Precipitation; Snow, Ice, and Frost; Evaporation and Transpiration; Streamflow and Runoff; Groundwater; Water in Soils; Lakes; Water in Plants; Erosion and Sedimentation; Chemical Processes; Estuaries.

03 WATER SUPPLY AUGMENTATION AND CONSERVATION
Includes the following Groups: Saline Water Conversion; Water Yield Improvement; Use of Water of Impaired Quality; Conservation in Domestic and Municipal Use; Conservation in Industry; Conservation in Agriculture.

04 WATER QUANTITY MANAGEMENT AND CONTROL
Includes the following Groups: Control of Water on the Surface; Groundwater Management; Effects on Water of Man's Non-Water Activities; Watershed Protection.

05 WATER QUALITY MANAGEMENT AND PROTECTION
Includes the following Groups: Identification of Pollutants; Sources of Pollution; Effects of Pollution; Waste Treatment Processes; Ultimate Disposal of Wastes; Water Treatment and Quality Alteration; Water Quality Control.

06 WATER RESOURCES PLANNING
Includes the following Groups: Techniques of Planning; Evaluation Process; Cost Allocation, Cost Sharing, Pricing/Repayment; Water Demand; Water Law and Institutions; Nonstructural Alternatives; Ecologic Impact of Water Development.

07 RESOURCES DATA
Includes the following Groups: Network Design; Data Acquisition; Evaluation, Processing and Publication.

08 ENGINEERING WORKS
Includes the following Groups: Structures; Hydraulics; Hydraulic Machinery; Soil Mechanics; Rock Mechanics and Geology; Concrete; Materials; Rapid Excavation; Fisheries Engineering.

09 MANPOWER, GRANTS, AND FACILITIES
Includes the following Groups: Education—Extramural; Education—In-House; Research Facilities; Grants, Contracts, and Research Act Allotments.

10 SCIENTIFIC AND TECHNICAL INFORMATION
Includes the following Groups: Acquisition and Processing; Reference and Retrieval; Secondary Publication and Distribution; Specialized Information Center Services; Translations; Preparation of Reviews.

SUBJECT INDEX

AUTHOR INDEX

ORGANIZATIONAL INDEX

ACCESSION NUMBER INDEX

ABSTRACT SOURCES

SELECTED WATER RESOURCES ABSTRACTS

1. NATURE OF WATER

1A. Properties

PHYSICAL PROPERTIES OF OXYGEN-17 WATER: ABSOLUTE VISCOSITY AND DENSITY OF H2(17)0 BETWEEN 15 AND 35C,
Weizmann Inst. of Science, Rehovot (Israel) Dept. of Isotope Research.
A. I. Kudish, D. Wolf, and F. Steckel.
Journal of the Chemical Society (London), Faraday Transactions I, No 3, p 484-489, 1974. 6 tab, 8 ref.

Descriptors: *Water properties, *Viscosity, *Density, *Isotope studies, Physicochemical properties, Heavy water, Deuterium, Oxygen isotopes, Temperature.

The absolute viscosity of four oxygen-17 water samples is reported at 5C intervals between 15 and 35C. The absolute viscosity of 100% H2(17)O is determined by extrapolation of the measured viscosity of a highly enriched oxygen-17 sample containing 86.53% O(17). The values calculated for the other samples, based on Eyring's viscosity theory, are in excellent agreement with experimental results. The isotope effect for H2 (17)O relative to natural water has been analyzed. Viscosity ratios at 25C are 1.0226 for O(17)/O(16) water, 1.0536 for O(18)/O(16) water, and 1.2316 for D2O(16)/H2O(16). (Brown-IPC)
W75-03881

2. WATER CYCLE

2A. General

DATA REDUCTION METHODS FOR HYDROLOGIC ANALYSES,
Los Angeles County Sanitation Districts, Whittier, Calif.
For primary bibliographic entry see Field 7C.
W75-03929

STOCHASTIC MODELS FOR THE INTERACTION OF RAINFALL AND GROUNDWATER LEVELS,
Purdue Univ., Lafayette, Ind.
A. Ramachandra Rao, R. L. Kashyap, and R. G. Srinivasa Rao.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 181, $3.25 in paper copy, $2.25 in microfiche. Paper presented at International Symposium on Development of Ground Water Resources, 1973, 15 p, 12 fig, 6 ref. OWRR C-3277(No 3713)(3).

Descriptors: *Groundwater, *Groundwater recharge, *Water table, Aquifers, *Precipitation, *Statistical models, Groundwater movement, Water table, Stochastic processes, Mathematical studies, Correlation analysis, Model studies.
Identifiers: *Stochastic models, Multivariate models, Univariate models, Transformed variant, Phase-spectrum test, Correlogram test, Co-spectrum test.

Aquifers are recharged by precipitation and, where the circumstances are favorable, by streamflow. Both rainfall and streamflow are considered as stochastic processes. Consequently, the recharge of an aquifer by rainfall of streamflow must also be considered as a stochastic process. Some preliminary results in developing stochastic models for the interaction of rainfall and groundwater level process are presented. Formulation and validation of univariate and multivariate models are discussed. The parameter estimation in multivariate models is discussed in detail. Because of availablility elsewhere, the parameter estimation of the univariate models is brief. The validation of both the univariate and multivariate models is dealt with in detail because of its obvious importance in model construction. Two conclusions are presented. Valid univariate models with excellent one step-ahead prediction capabilities can be developed for modelling the ground water level process. Because of its random nature, at least for the data analyzed in the present study, rainfall does not appear to be very significant in modelling the ground water level process.
W75-03949

WORLDWIDE DISTRIBUTIONS OF MEAN MONTHLY DEWPOINT,
Army Engineer Topographic Lab., Fort Belvoir, Va.
H. L. Ohman.
Department of the Army, U.S. Army Engineer Topographic Laboratories. Geographic Sciences Laboratory, Report No. ETL-SR-74-2, November, 1973, 28 p 12 fig, 14 refs.

Descriptors: *Dew point, *Isotherms, *Maps, *Distribution patterns, *Design criteria, Temperature, Elevation, Moisture availability, Vegetation, Monthly.

Twelve global maps showing the mean monthly dewpoint temperatures for each month are presented. The distributional characteristics were found to be influenced primarily by air temperature, distance from and degree of exposure to moisture surfaces, and the depressing effects of elevation. The maps for January and July provided estimates for the mean annual range of dewpoint temperature which can be useful in design engineering purposes. (Mastic-Arizona)
W75-04130

APPLICATIONS OF SYSTEMS ANALYSIS TO INTERNATIONAL WATER RESOURCES PROJECTS,
California Univ., Davis. Dept. of Civil Engineering.
For primary bibliographic entry see Field 6A.
W75-04232

THE NONLINEAR RAINFALL RESPONSE OF WATERSHEDS WITH TIME DEPENDENT STORAGE AND CONVEYANCE PROPERTIES,
Cincinnati Univ., Ohio. Dept. of Engineering Analysis.
A. M. Strauss.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 361-366. 7 ref.

Descriptors: *Rainfall-runoff relationships, *Estimating equations, Mathematical models, *Time series analysis, Analytical techniques, Watersheds(Basins), Storage, Hydrologic systems.
Identifiers: *Nonlinear rainfall response, *Time dependence, Conveyance properties.

The time variability of watersheds must be taken into account if a watershed is to be accurately modeled. Mathematical formulae quantifying presently acceptable rainfall-runoff and general hydrological systems were presented and tempered in a manner to account for observed time dependent properties. Long term models, especially, must take into account such natural processes as weathering, erosion, and climatic change. Coupling these with the effects of man's activities, it was suggested that one watershed ageing term be used when modifying current methods. (See also W75-04213) (Jess-ISWS)
W75-04240

A DISCRETE LINEAR MODEL FOR THE HYDROLOGIC BASIN,
Indian Inst. of Tech., Kanpur. Dept. of Civil Engineering.
S. Ramaseshan, U. C. Chaube, and A. K. Sharma.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 367-376. 2 fig, 1 tab, 17 ref.

Descriptors: *Hydrologic systems, *Rainfall-runoff relationships, *Model studies, Digital computers, Water loss, Storm runoff, Surface runoff, Recharge, Bank storage, Peak discharge, Hydrology, Mathematical models, *Model studies.
Identifiers: *Discrete linear model, Time series model, Differential model.

The data used in hydrologic analyses are generally discrete and facilitate the use of digital computers for their solutions. A discrete linear model for the hydrologic basin was presented. It was essentially a time series model and could be related to the differential model of Chow and Kulandaiswamy. With a discrete data representation of the process and a finite order of the model, detection of component processes like abstraction and apparent effective rainfall was attempted on the basis of the fitted model. It was indicated that abstraction is present even after the end of a storm and that recharge from bank storage and/or interflow is present generally after a flood peak. A descriptive model to explain the physical process was suggested. The procedure was illustrated with an example. (See also W75-04213) (Singh-ISWS)
W75-04242

INTERACTION OF BULK PRECIPITATION, STREAM WATER, AND SEWAGE IN A SMALL WATERSHED NEAR OXFORD, MISSISSIPPI,
Mississippi Univ., University. Dept. of Geology and Geological Engineering.
For primary bibliographic entry see Field 5B.
W75-04254

A METHOD FOR MAINTAINING CROSS AND SERIAL CORRELATIONS AND THE COEFFICIENT OF SKEWNESS UNDER GENERATION IN A LINEAR BIVARIATE REGRESSION MODEL,
Tahal Consulting Engineers Ltd., Tel Aviv (Israel). Dept. of Research, Development and Planning.
For primary bibliographic entry see Field 2E.
W75-04309

GROUNDWATER STORAGE-RIVERFLOW RELATIONS IN A CHALK CATCHMENT,
Institute of Geological Sciences, London (England). Dept. of Hydrogeology.
S. S. D. Foster.
Journal of Hydrology, Vol 23, No 3/4, p 299-311, 1974. 5 fig, 2 tab, 8 ref.

Descriptors: *Base flow, *Surface-groundwater relationships, *River flow, *Watersheds(Basins), *Water storage, Transmissivity, Specific yield, Storage coefficient, Mathematical models, Recession curves, Water level fluctuations, Stage-discharge relations.
Identifiers: *United Kingdom(Hull River), Linear reservoirs, Chalk catchments.

Data from continuously monitored observation boreholes and the permanent river gaging station in the West Beck catchment of the East Yorkshire Chalk were presented and analyzed. Layered hydraulic structure in the chalk aquifer was reflected in the form of and correlation between recession characteristics. A series of fairly well defined linear storage elements, each with differ-

ing coefficients of permeability and storage, appeared to be present. The distribution and variation of storage and permeability with depth may be critical factors in catchments such as this, where schemes for augmentation of drought riverflows from groundwater storage are under consideration or in pilot development. (Visocky-ISWS)
W75-04339

THE UNIT HYDROGRAPH: A SATISFACTORY MODEL OF WATERSHED RESPONSE,
Massey Univ., Palmerston North (New Zealand). Dept. of Geography.
R. G. Heerdegen.
Water Resources Bulletin, Vol 10, No 6, p 1143-1161, December 1974. 2 fig, 6 tab, 38 ref.

Descriptors: *Unit hydrographs, *Storm runoff, *Hydrograph analysis, Surface runoff, Streamflow, Hydrographs, Hydrology, Runoff, *Watersheds(Basins), *Pennsylvania, Seasonal, Climatic data, *Least squares method, Model studies, Mathematical models, Floods.
Identifiers: Watershed response, Watershed parameters.

Some 96 flood events larger than the mean annual flood from 16 watersheds in the Commonwealth of Pennsylvania were used to derive unit hydrographs by the least-squares method. Analyses of the unit hydrographs were conducted to ascertain their response to watershed parameters, climatic and storm variables, and locations within different hydrologic regions. Significant differences both within and among watersheds led to the formulation and testing of hypotheses stating that differences among watersheds are caused by physiographic differences while differences within watersheds result from climatic and storm differences. The analysis showed that while many watersheds parameters strongly influence the shape of the unit hydrograph, only the storm variables duration and volume of precipitation excess produce significant differences. Seasonal differences were apparent but not proven statistically significant. (Terstriep-ISWS)
W75-04344

2B. Precipitation

RELATIONSHIPS OF RING WIDTHS IN ARID-SITE CONIFERS TO VARIATIONS IN MONTHLY TEMPERATURE AND PRECIPITATION,
Arizona Univ., Tucson. Lab. of Tree-Ring Research.
For primary bibliographic entry see Field 2I.
W75-03964

STOCHASTIC SIMULATION OF DAILY RAINFALL,
Kentucky Water Resources Inst., Lexington.
D. M. Allen, C. T. Haan, D. Linton, J. Streeb, and D. Jordan.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 268, $5.25 in paper copy, $2.25 in microfiche. Research Report No. 82, 1975. 112 p, 1 fig, 13 tab, 8 ref, 4 append. OWRT A-045-KY(1). 14-31-0001-3817, and 14-31-0001-4017.

Descriptors: Simulation analysis, *Rainfall disposition, Hydrology, Precipitation(Atmospheric), Rainfall, *Stochastic processes, *Markov processes, Distribution patterns, *Kentucky, *Model studies, Water supply, Design, Probability.

The design of many water resources projects requires knowledge of possible long-term rainfall patterns. A stochastic model based on a first order Markov chain was developed to simulate daily rainfall at a point. The model is applicable to any point in Kentucky (and other areas with similar rainfall patterns). The model in its present form is useful in providing rainfall inputs into hydrologic models for designing water supply facilities and other water resources systems. The model uses historical rainfall data to estimate the Markov transitional probabilities. A separate matrix is estimated for each month of the year. In this report 7 x 7 transitional probability matrices were used. The model is capable of simulating a daily rainfall record of any length based on the estimated transitional probabilities and frequency distributions of rainfall amounts within each class interval. The simulated data are statistical properties similar to historical data. (Grieves-Kentucky)
W75-04036

NUCLEAR METEOROLOGY,
Hydrometeorological Service of the USSR, Moscow.
For primary bibliographic entry see Field 5B.
W75-04054

SOME CHARACTERISTICS OF UPPER CLOUDS AND SUGGESTIONS REGARDING THE UTILIZATION OF RADIOACTIVE TRACERS IN MERIDIONAL FLOWS,
N. N. Romanov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 40-41.

Descriptors: *Meteorology, *Radioactivity, *Tracers, *Climatology, *Clouds, *Weather, *Winds, Air circulation, Research equipment, Aircraft, Latitudinal studies.

The analysis of numerous reports of aircraft pilots and observations during research flights in TU-104 and IL-18 aircraft led to the establishment of a relationship between the development of upper clouds and the direction of wind with a large meridional component. Independently of the character of the baric field, the clouds develop under southern and southwestern stable flows and are destroyed (or are absent) by northern and northeastern flows. This relationship is expressed more strongly in low latitudes and is weaker in high latitudes. It is assumed that such a relationship results from stable vertical currents of positive or negative sign, appearing in meridional flows on the rotation Earth. It is suggested that direct measurement of vertical motions be conducted with the aid of radioactive tracers during a rationally selected synoptic situation. (See also W75-04054) (Houser-ORNL)
W75-04059

MEAN AND TURBULENT TRANSFER OF SUBSTANCES OVER THE USSR,
I. G. Guterman.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 42-56, 10 fig, 1 tab, 13 ref.

Descriptors: *Meteorology, *Climatology, *Winds, *Turbulence, Movement, *Mixing, *Boundary layers, *Moisture, Humidity, Precipitable water, Measurement, Atmospheric pollution, Height, Seasonal, Temperature.
Identifiers: *USSR, Fluxes.

The relation is examined between the mean and turbulent fluxes of substances at the limit of the atmospheric boundary layer (1.5 km) in January and July over the USSR. The intensity of macroturbulent fluctuations, characterized by the ratio of the vectorial standard deviation of wind Sigma (sub v) to the modulus of the resultant wind (absolute value of vector V (sub r)), is equal to 100-500% in winter and 200-2,000% in summer. This results mainly from the decrease in mean transfer, since the macroturbulent component of the motion Sigma(sub v) in summer is of the same order as in winter. Turbulent heat fluxes in January hardly attain 1-3% of the fluxes due to the mean motion, while in July this ratio increases to 4-7%. Therefore, the practically horizontal heat fluxes at that level can be calculated from data on the mean temperature and resultant wind. The streamlines of turbulent heat fluxes coincide with the direction of the temperature gradient and, over the USSR in both January and July, are generally opposite to or intersect at right angles the streamlines plotted on the basis of the average wind speed vector. Hence the total heat fluxes are vectorially somewhat smaller than the mean heat fluxes. Horizontal turbulent moisture fluxes make a more important contribution to the total moisture flux. At 1.5 km, the ratio of the turbulent moisture flux to the moisture carried by the mean motion fluctuates between 20 and 180%, and in July between 40 and 140%. (See also W75-04054) (Houser-ORNL)
W75-04060

SOME THEORETICAL NOTIONS OF RADIOACTIVITY ACQUISITION BY RAINDROPS,
For primary bibliographic entry see Field 5B.
W75-04072

DISTRIBUTION OF RAINDROPS WITH RESPECT TO SPECIFIC RADIOACTIVITY,
B. I. Styro, and B. K. Vebrene.
In: Nuclear Meterology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 133-136, 4 fig, 2 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioactivity, *Radioisotopes, Distribution, *Raindrops, Analytical techniques, Density, Fallout, Clouds, Air circulation, Polonium, Research and development, Mathematics.
Identifiers: Specific radioactivity.

The distribution of raindrops was investigated with respect to their specific radioactivity. The distribution curves of droplets are similar for a uniform distribution of the isotope and when it is introduced at some point in the cloud. The position of the maximum on the curve depends on the isotope quantity. The variation in the specific radioactivity of rain during its fall was also investigated. The first specific radioactivity maximum appears several minutes after the isotope is introduced in the cloud. The second, not so sharp maximum appears after 10-15 minutes. The very rapid (3-4 min) appearance of activated droplets at the earth's surface is associated with the accelerating effect of descending air currents. (See also W75-04054) (Houser-ORNL)
W75-04073

APPLICATION OF THE STOCHASTIC APPROACH TO THE PROBLEM OF THE RADIOACTIVITY OF RAINDROPS AND CLOUD-BORNE DROPS,
For primary bibliographic entry see Field 5B.
W75-04074

COMPARISON OF THE CHARACTERISTICS OF HYGROSCOPIC AND NON-HYGROSCOPIC AERSOL WASHOUT BY CLOUD-BORNE DROPS,
For primary bibliographic entry see Field 5B.
W75-04075

ATMOSPHERIC WASHOUT OF RADIOACTIVE CONTAMINANT IN THE MOUNTAINS OF CENTRAL CAUCASUS,
For primary bibliographic entry see Field 5B.
W75-04076

RELATION BETWEEN ATMOSPHERIC PRECIPITATION WASHOUT OF RADIO-ACTIVITY AND NONACTIVE IONS,
For primary bibliographic entry see Field 5B.
W75-04079

COSMOGONIC SODIUM-22 AND BERYLLIUM-7 ISOTOPES IN INVESTIGATIONS OF ATMOSPHERIC DYNAMICS,
For primary bibliographic entry see Field 5B.
W75-04081

ARGON SPALLATION YIELDS OF COSMOGONIC RADIOISOTOPES,
For primary bibliographic entry see Field 5B.
W75-04082

TRACE ELEMENTS AND NATUR RADIOACTIVITY IN CLOUD WATER AND ATMOSPHERIC PRECIPITATION IN THE CENTRAL CAUCASUS MOUNTAINS,
For primary bibliographic entry see Field 5A.
W75-04108

PROJECT SKYWATER.
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 3B.
W75-04265

OBJECTIVE DOUBLE-MASS ANALYSIS,
West Virginia Univ., Morgantown. Water Research Inst.
M. Chang, and R. Lee.
Water Resources Research, Vol 10, No 6, p 1123-1126, December 1974. 3 fig, 5 tab, 5 ref.

Descriptors: *Mass curves, *Precipitation(Atmospheric), *Gaging stations, *Relocation, Computers, Statistical methods, Hydrologic data, Methodology, Spatial distribution, Analytical techniques, Topography, *Time series analysis.
Identifiers: Consistent simultaneous series, Multiple inconsistencies, Subjective methods, *Data analysis.

The consistency of an observed time series was tested by double-mass analysis with an appropriate and consistent simultaneous series. Partially inconsistent series were adjusted to relative consistency with the simultaneous series. A general, completely computerized method of double-mass analysis was devised to reduce subjectivity to a minimum. The only subjective assumptions retained were that a proportionality change in annual data is worthy of note if it persists for at least 5 years and that the statistical significance of a proportionality change (at any selected alpha level) was a necessary and sufficient reason for adjusting the data of the inconsistent partial series. A general technique for handling multiple inconsistencies was developed. Data inconsistency tests suggested important physical causes for the deviations. Site and gage exposure parameters, in conjunction with local precipitation data, explained much of the statistical variability in the characteristic spatial distribution of annual precipitation in mountainous areas. (Singh-ISWS)
W75-04307

THE USE OF STEREO, HORIZONTAL, AND GROUND LEVEL ORIFICE GAGES TO DETERMINE A RAINFALL-ELEVATION RELATIONSHIP,
Eidgenoessische Technische Hochschule, Zurich (Switzerland). Versuchsanstalt fuer Wasserbau, Hydrologie und Glaziologie.
B. Sevruk.
Water Resources Research, Vol 10, No 6, p 1138-1141, December 1974. 3 fig, 1 tab, 39 ref.

Descriptors: *Mountains, *Precipitation(Atmospheric), Alpine, Statistical methods, Rainfall, Winds, Networks, *Rain gages, Watersheds(Basins), Measurement, *Instrumentation.
Identifiers: *Rainfall-elevation relationships, Storage gages, Wind shields, *Stereo orifices, *Switzerland(Baye de Montreux).

In the range of altitude from 1100 to 1850 m above sea level the mean rainfall totals over a 10-year period from June to September as measured by means of 22 storage gages with horizontal orifices and wind shields generally decreased with increasing elevation in the upper part (6.8 sq km) of the prealpine watershed of Baye de Montreux. The substitution of a stereo orifice for the horizontal one on the nine gages located on the slopes open to rain-bearing winds resulted in a slightly increasing mean rainfall catch with increasing elevation (r = 0.430). After 23 ground level stereo gages were set up in the watershed, a visible improvement in the rainfall-elevation relationship was registered (r = 0.710). (Jones-ISWS)
W75-04330

2C. Snow, Ice, and Frost

DETERMINATION OF RADIOISOTOPE FALLOUT FROM ITS CONTENT IN CHRONOLOGICAL LAYERS OF HIGH-ALTITUDE GLACIERS,
For primary bibliographic entry see Field 5A.
W75-04057

HORIZONTAL WATER MIGRATION OF STRONTIUM-90,
For primary bibliographic entry see Field 5B.
W75-04066

NATURAL SNOWFLAKE RADIOACTIVITY DUE TO SHORT-LIVED RADON DECAY PRODUCTS,
For primary bibliographic entry see Field 5A.
W75-04107

GENERAL DISPOSITION AND AQUATIC ENVIRONMENTAL EFFECTS OF SILVER IODIDE IN PRECIPITATION MANAGEMENT,
Colorado State Univ., Fort Collins. Dept. of Earth Resources.
For primary bibliographic entry see Field 3B.
W75-04255

DEEP SNOW MEASUREMENTS SUGGESTED USING COSMIC RADIATION,
National Weather Service, Silver Spring, Md.
V. C. Bissell, and Z. G. Burson.
Water Resources Research, Vol 10, No 6, p 1243-1244, December 1974. 2 fig, 8 ref.

Descriptors: Snow, Instrumentation, *Radiation, *Water equivalent, *Snow cover, Attenuation, Soil moisture, Statistical methods, *Measurement, *Nevada.
Identifiers: *Lake Mead(Nev), Cosmic radiation.

The attenuation of highly penetrating cosmic radiation shows promise as a means of measuring the water equivalent of snow cover. The attenuation of cosmic radiation by water is sufficient to make the method practicable, especially for deep snow. As an example, statistical counting errors in a two-detector setup (with 10 cm by 10 cm NaI(T1) scintillation detectors, one above the snow and one beneath the snow) would produce a water equivalent measurement accuracy of better than 1% in measuring 100 cm of water with a 24-hour measurement time. (Jones-ISWS)
W75-04331

2D. Evaporation and Transpiration

AN ENERGY PARTITION EVAPORATION RECORDER,
Commonwealth Scientific and Industrial Research Organization, Mordialic (Australia). Div. of Atmospheric Physics.
A. C. Dilley.
Division of Atmospheric Physics CSIRO Australia Technical Paper No 24, 1974. 25 p, 17 fig, 15 ref.

Descriptors: *Monitoring, *Evaporation, *Evaporimeters, *Energy budget, Radiation, Heat transfer, Hygrometry, Water vapor, Measurement, Instrumentation, Logging(Recording), On-site tests.

An instrument is described which provides a near-continuous measurement of evaporation from natural surfaces. The instrument employs a resistive bridge technique to sense net radiation, ambient wet-bulb temperature and dry- and wet-bulb temperature differences, and employs a servo-balance system to combine the corresponding electrical signals according to a modified version of the energy balance formula. Details are given of the instrument's construction, calibration, field operation and performance. (Levick-CSIRO)
W75-03937

EFFECTS OF LOW WATER POTENTIALS ON TRANSPIRATION AND PHOTOSYNTHESIS IN MITCHELL GRASS (ASTREBLA LAPPACEA),
Queensland Univ., Brisbane (Australia). Dept. of Botany.
D. Doley, and N. B. A. Trivett.
Australian Journal of Plant Physiology, Vol 1, No 4, p 539-550, December 1974. 8 fig, 1 tab, 33 ref.

Descriptors: *Range grasses, *Australia, *Drought tolerance, Leaves, Stomata, Transpiration control, *Transpiration, *Photosynthesis, Pastures, Semiarid climates, Moisture stress.
Identifiers: *Mitchell grass, Astrebla lappacea, Queensland.

The Mitchell grasses are an important component of the dry season forage of central and western Queensland (Australia), and curly Mitchell grass, Astrebla lappacea, is the dominant species of the association in drier sites. Preliminary studies are reported on the effects of reduced leaf water potential on gas exchange in this species. Close linear relationships were established between leaf water potential and both transpiration and net photosynthesis; most of the variation in gas exchange could be attributed to changes in stomatal diffusion resistance. Gas exchange exhibited a remarkable recovery after brief but severe drought, although there was some inhibition of both transpiration and photosynthesis for about one week following rewatering. It is concluded that A. lappacea demonstrates a high degree of true drought tolerance. (Levick-CSIRO)
W75-03938

THE THREE STAGES OF DRYING A FIELD SOIL,
Agricultural Research Service, Phoenix, Ariz., Water Conservation Lab.
S. B. Idso, R. J. Reginato, R. D. Jackson, B. A. Kimball, and F. S. Nakayama.
Soil Science Society of America, Proceedings, Vol 38, No. 5, September-October, 1974. p 831-837, 6 fig, 19 ref.

Descriptors: *Evaporation, *Soil moisture, *Albedo, *Moisture content, *Drying, Soil surfaces, Soil temperature, Clay loam, Solar radiation, Dry farming, Irrigation, *Arizona.

Drying experiments were conducted on a smooth, bare field of clay loam during all seasons at Phoenix, Arizona. Measurements were made of evaporation, Soil-water contents, soil temperature, soil heat flux, albedo, and net radiation. From these measurements, three stages of soil drying were outlined. The first stage was characterized by potential evaporation. The second stage was characterized by drying of the soil surface, and significantly reduced evaporation. Stage three appears to begin when the surface water content corresponds to a retention of two molecular layers of water about the soil particles at that level; a

value of about 0.06 in this soil. A rewetting of the soil surface at night may reinstate stage two drying on the following morning after stage three initiation. Simple albedo measurements often predicted the transition points between the different stages. (Mastic-Arizona)
W75-03965

EFFECTS OF CCC ON DROUGHT RESISTANCE OF TRITICUM AESTIVUM L AND ZEA MAYS L,
Oxford Univ. (England). Dept. of Agricultural Science.
For primary bibliographic entry see Field 3F.
W75-04011

OPEN CHANNEL FLOW EVAPORATION STUDY,
Bonneville Power Administration, Portland, Oreg.
J. R. Liaw.
Intern Report, September 1973. 112 p, 23 fig, 3 tab, 47 ref.

Descriptors: *Evaporation, *Rivers, *Thermodynamics, *Numerical analysis, Energy equation, Equations, Analysis, *Oregon, Continuity equation, Winds, Meteorological data, Temperature, On-site investigations.
Identifiers: Conservation equations, Ideal gas law, *Little Deschutes River(Ore), Kinetic theory of gases.

A better understanding of evaporation from the surface of a non-stationary water body has been needed for accurate water temperature forecasting and evaporation-loss prediction. An entirely new formula was postulated by combining kinetic molecular theory, conservation of mass and energy, and the ideal gas law. This formulation was tested by using 3-hour data from the Little Deschutes River in Oregon for July 29-31, 1969. The new evaporation equation is deterministic, but it includes a dynamic wind function. The determination of the 3 dynamic coefficients for the wind function was done by an original approach. The numerical solution required basic matrix theory, the Newton-Raphson iteration scheme, and a finite difference approximation to the one-dimensional first law of thermodynamics. (Adams-ISWS)
W75-04273

2E. Streamflow and Runoff

TRANSVERSE MIXING IN RIVERS; A NUMERICAL APPROACH,
Waterloopkundig Laboratorium, Delft (Netherlands). Mathematics Branch.
For primary bibliographic entry see Field 8B.
W75-03917

MODEL-PROTOTYPE COMPARISONS FOR TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
For primary bibliographic entry see Field 8B.
W75-03918

LABORATORY STUDIES ON TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
For primary bibliographic entry see Field 8B.
W75-03928

HYDROLOGIC ANALYSIS OF THE MOJAVE RIVER, CALIFORNIA, USING A MATHEMATICAL MODEL,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
W75-03967

CREST-STAGE GAGING STATIONS IN OREGON--A COMPILATION OF PEAK DATA COLLECTED FROM OCTOBER 1952 TO SEPTEMBER 1974,
Geological Survey, Portland, Oreg.
For primary bibliographic entry see Field 7C.
W75-03969

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR BALDWIN LAKE, SAN BERNARDINO COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2H.
W75-03981

THE ULTRASONIC METHOD OF RIVER GAUGING,
Department of the Environment, Reading (England). Water Data Unit.
For primary bibliographic entry see Field 4A.
W75-04026

THE HYDRAULIC GEOMETRY OF A DISCONTINUOUS EPHEMERAL STREAM IN A BAJADA NEAR TUCSON, ARIZONA,
Arizona Univ., Tucson. Dept. of Geosciences.
F. A. Packard.
PhD/Dissertation 1974. 127 p, 20 fig, 2 tab, 27 ref.

Descriptors: *Ephemeral streams, *Streamflow, *Hydrology, *Channel morphology, *Model studies, *Hydrologic models, Geomorphology, Alluvial fans, Alluvium, Alluvial channels, Gullies, Braiding, Chutes, Perennial streams, Channeling, Valleys, Regression analysis.
Identifiers: Bajada, Hydraulic geometry.

An attempt was made to extend knowledge of the relationships among deposition, scour, morphology, and hydraulics along ephemeral discontinuous streams; develop a model for the alluviation of valleys by discontinuous streams; provide analogies between the study stream and descriptions of perennials streams; and clarify the role of discontinuous channels in the evolution of flat, grass-covered sheetflood valleys to gullied valleys. A detailed description of a discontinuity within the study area is presented with information on braid-chute units, flow data and a comparison of flow data along braid and chute reaches. Also discussed in detail is the morphology and hydrology of a fan within the study area and included is a proposed theoretical model for valley alluviation by an ephemeral discontinuous stream. (Mastic-Arizona)
W75-04125

SPECIAL FLOOD HAZARD INFORMATION REPORT: YOCKANOOKANY RIVER, DYE DITCH AND MUNSON CREEK, KOSCIUSKO, ATTALA COUNTY, MISSISSIPPI.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-04204

FLOOD PLAIN INFORMATION: JORDAN RIVER COMPLEX II, MIDVALE-DRAPER, UTAH.
Army Engineer District, Sacramento, Calif.
For primary bibliographic entry see Field 4A.
W75-04205

FLOOD PLAIN INFORMATION: NORTH RUN, HENRICO COUNTY, VIRGINIA,
Army Engineer District, Norfolk, Va.
F. B. Proctor.
February, 1966. 12 p, 3 fig, photos; Technical Appendix, 25 p, Illus.

Descriptors: *Flood forecasting, *Flood plain zoning, *Flood profiles, Flood damage, Obstruction to flow, Land use, Planning, Virginia.
Identifiers: *North Run(Virginia), *Thorpe Branch(Virginia), *Rocky Branch(Virginia), *Hungary Creek(Virginia), *Henrico County, Richmond, Flood plain management, '50-year flood', Standard Project Flood.

Flood plains along North Run and its main tributaries, Thorpe Branch, Rocky Branch, and Hungary Creek, are very steep, with relatively narrow stream channels. Classified as essentially suburban with respect to development, the watershed still has large areas of woods and dense undergrowth. Due to its proximity to Richmond, it is expected that development will continue at an accelerated rate with resultant serious flood problems unless measures are taken to keep flood damage to a minimum. Extreme floods may be caused by storms which produce rainfall over a period of 6 hours or less. Both natural and man-made features may create obstructions to flow. No records of flooding or public awareness of the flood problem exist since in prior years the area was sparsely settled. Flood flows used in this study are based on flow records on small watersheds in the surrounding areas. At the mouth of North Run, the expected peak discharge of a '50-year flood' is 7,700 cfs and of a Standard Project Flood (SPF) is 16,200 cfs. Ways and means of preventing future damage on the flood plains are discussed in the technical appendix which also includes flood profiles, rainfall data and discharge estimates. If the watershed and flood plains are developed properly, there should be no need for flood control structures. (Diefendorf- North Carolina)
W75-04208

FLOOD PLAIN INFORMATION: GILLIES CREEK, HENRICO COUNTY, VIRGINIA,
Army Engineer District, Norfolk, Va.
F. B. Proctor.
October, 1966, 12 p, 3 fig, technical append, photos.

Descriptors: *Flood forecasting, *Flood plain zoning, *Flood profiles, Obstruction to flow, Land use, Planning, Flood warning, Virginia.
Identifiers: *Gillies Creek(Virginia), *Henrico County(Virginia), *Lawndale Farms Branch(Virginia), *Hechler Village Branch(Virginia), Flood plain management, Standard Project Flood, '50-Year Flood,' Richmond(Virginia).

The area included is a portion of Henrico County which is being rapidly developed as the housing areas push outward from Richmond. Main stream channels of Gillies Creek and its two tributaries, Lawndale Farms Branch and Hechler Village Branch, are relatively shallow and overgrown with dense vegetation. This vegetation along with 13 bridges and culverts and 2 dams create obstructions to flood flow. There are no records of flooding or public awareness of the flood problem since flooding in prior years was largely unnoticed because the area was sparsely settled. Due to lack of records of flood experience, flood flows used in the study are entirely computed, based on rainfall records and on flow records of surrounding streams. At the mouth of Gillies Creek, a '50-Year Flood' would reach a peak discharge of 6,900 cfs and a Standard Project Flood (SPF) would reach 15,850 cfs. Probable flood lines are presented for use as a guide to be considered in controlling construction on the flood plain and to inform the public on the possibility of flooding. Many of the following ways of preventing future damage on flood plains have been initiated: flood plain zoning, building codes, sub-division regulations, flood plain evacuation, flood proofing. However, as far as is known, there are no existing, planned, or authorized flood control works. (Diefendorf-North Carolina)
W75-04209

FLOOD PLAIN INFORMATION: CHOCTAWHATCHEE RIVER, PEA RIVER, DOUBLE BRIDGES CREEK, CITY OF GENEVA, ALABAMA.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-04212

EVALUATION OF WATER TEMPERATURE FIELDS RESULTING FROM HEATED WATER DISCHARGES,
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
For primary bibliographic entry see Field 5B.
W75-04215

REVIEW OF HEATED SURFACE DISCHARGE MODELS APPLICABLE TO RIVERS,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
For primary bibliographic entry see Field 5B.
W75-04229

MATHEMATICAL MODELLING AND IDENTIFICATION OF THERMAL POLLUTION IN STREAMS: A REVIEW PAPER,
Case Western Reserve Univ., Cleveland, Ohio. Systems Engineering Div.
For primary bibliographic entry see Field 5B.
W75-04230

SENSITIVITY ANALYSIS OF THE OPTIMUM DESIGN FLOOD EVALUATED BY AN OPTIMIZATION PROCEDURE,
Karlsruhe Univ. (West Germany). Theodor-Rehbock Lab. for River Improvement.
For primary bibliographic entry see Field 4A.
W75-04234

THE TRIANGLE AS A TENTATIVE UNIT HYDROGRAPH,
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W75-04239

A DOUBLE-TRIANGLE MODEL FOR GENERATING STORM HYDROGRAPHS,
Tennessee Valley Authority, Knoxville, Tenn. Hydrologic Research and Analysis Office.
For primary bibliographic entry see Field 4A.
W75-04241

A DISCRETE LINEAR MODEL FOR THE HYDROLOGIC BASIN,
Indian Inst. of Tech., Kanpur. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-04242

RUN-OFF REGULATION OF THE ST. LAWRENCE AND ITS LIABILITY,
Bedford Inst., Dartmouth (Nova Scotia).
For primary bibliographic entry see Field 4A.
W75-04243

A SET OF REGIME EQUATIONS FOR INDIRECTLY ESTIMATING STREAM FLOW CHARACTERISTICS,
Ohio River Basin Commission, Cincinnati.
E. A. Joering, and H. C. Preul.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 411-426. 5 fig, 1 tab, 20 ref.

Descriptors: *Channel morphology, *Alluvial channels, *Estimating equations, *Streamflow, *Channels, Regime, Channel flow, Discharge(Water), Depth, Slopes, Width, Roughness(Hydraulic), Hydraulics, Sediment transport, Annual flood, Runoff, Velocity.
Identifiers: *Hydraulic geometry, Ungaged watersheds.

A set of downstream regime equations was presented for the purpose of indirectly estimating streamflow characteristics. For use with the regime equations, empirically determined coefficients were developed for sixteen different types of channel materials. When combined with a set of universal exponents, the coefficients provide for the use of a set of equations which define the width, depth, velocity, and slope of a natural channel under bankfull flow conditions. The general form of the equations follows that previously suggested by Leopold and Maddock (1953) in a paper on hydraulic geometry. (See also W75-04213) (Humphreys-ISWS)
W75-04245

CLASSIC CANAL THEORY WITH GRAPHS AND TABLES. VOLUME I,
Hawaii Inst. of Geophysics, Honolulu.
For primary bibliographic entry see Field 8B.
W75-04269

CLASSICAL CANAL THEORY WITH GRAPHS AND TABLES. VOLUME II,
Hawaii Inst. of Geophysics, Honolulu.
For primary bibliographic entry see Field 8B.
W75-04270

SURFACE WATER DATA OF THE UPPER MICHIGAN REGION PROJECT SANGUINE, SITE STUDY.
EDAW, Inc., San Francisco, Calif.
Available from the National Technical Information Service, Springfield, Va. 22161, as AD-780 290, $4.25 paper copy, $2.25 microfiche. February 1974. 44 p, 2 fig, 2 tab, 20 ref, 3 append. Contract N62472-73-C-1056.

Descriptors: *Surface water availability, *Surface drainage, *Surface runoff, Streams, Rivers, Drainage, Permeability, Storage, Quality control, Glacial drift, Bacteria, Silts, Scour, *Lake Michigan, *Lake Superior, *On-site data collections, *Michigan, Water quality, Surface waters.

The study area is drained by many streams that converge into large streams and rivers flowing out of the area. These major drainages flow in two general directions. Large streams draining the northern and western portions generally flow north to Lake Superior. Streams draining the central and southeastern portions drain southeastward into Lake Michigan, or into the Menominee River (which also drains into Lake Michigan). The drainage is poorly developed in most of the area and it is characterized by numerous ponds, lakes, and swampy areas. There are often thick and extensive deposits of permeable glacial overburden, and during rain periods, much of the rain infiltrates the ground instead of running off. The presence of significant numbers of surface water bodies allows temporary storage of surface runoff. These factors combine to produce a streamflow behavior characterized by relatively gradual rises in streams, moderate peak flows, and then gradual declines in streamflow. The quality of water in the streams is generally good. The Precambrian bedrock yields little soluble material to the streams. The overlying glacial deposits in this area yield only small amounts of soluble materials. There is some bacterial contamination of streams and lakes in highly populated parts of the area. Silt loads in the streams are generally low, although stream turbidities can be high in local areas downstream of mining operations. There are potential scour problems in areas where there are appreciable thicknesses of unconsolidated glacial deposit materials. Surface water resources are not extensively developed. The main uses of streams and lakes are for recreation, fishing, and dilution of wastes. (Dawes-ISWS)
W75-04277

A METHOD FOR MAINTAINING CROSS AND SERIAL CORRELATIONS AND THE COEFFICIENT OF SKEWNESS UNDER GENERATION IN A LINEAR BIVARIATE REGRESSION MODEL,
Tahal Consulting Engineers Ltd., Tel Aviv (Israel). Dept. of Research, Development and Planning.
J. P. Kahan.
Water Resources Research, Vol 10, No 6, p 1245-1248, December 1974. 8 ref, append.

Descriptors: *Synthetic hydrology, *River flow, *Statistical analysis, Time series analysis, Stochastic processes, *Regression analysis, Hydrologic data, Model studies, Analytical techniques, Correlation analysis, Monthly.
Identifiers: *Bivariate regression model, Serial correlations, Gamma random variables.

A methodology was presented for generating a series of monthly flows at a gaging station when monthly flows at another gaging station can be generated and the historic monthly flows at the two gaging stations were correlated. The mean, standard deviation, and coefficient of skewness of the generated values were chosen to conform with known data. A stepwise process was postulated whereby, unlike the usual multiple-regression technique, an extra variable was added to the otherwise complete model. By using this technique to coefficient of skewness of the flows can be maintained, a result that circumvents any attempt to calculate the joint moment generating function of gamma random variables, which proved to be the stumbling block of prior analyses. (Singh-ISWS)
W75-04309

CRE: A METHOD FOR SOLVING PROBABILITY PROBLEMS RELATED TO HYDROLOGIC TIME SERIES,
Idrotecneco, San Lorenzo in Campo, (Italy).
L. Torelli.
Water Resources Research, Vol 10, No 6, p 1113-1122, December 1974. 9 fig, 4 ref.

Descriptors: *Time series analysis, *Distribution patterns, *Statistical analysis, *Algorithms, *Numerical analysis, Stochastic processes, Methodology, Simulation analysis, Computers, Streamflow, Hydrology.
Identifiers: *Discrete distribution, Periodically correlated processes, Discretization.

When the probability structure of a time series is known, a number of probability problems related to the series remain to be answered. A new method (CRE, event realization counter) for solving such problems was proposed. It consists of approximating the original series with continuous distribution by a suitable series with discrete distribution. Exact solutions of the problems in consideration can be derived. The validity of the approximation was checked, the algorithms used were described, and a few applications of the method were shown. (Singh-ISWS)
W75-04310

GROUNDWATER STORAGE-RIVERFLOW RELATIONS IN A CHALK CATCHMENT,
Institute of Geological Sciences, London (England). Dept. of Hydrogeology.
For primary bibliographic entry see Field 2A.
W75-04339

THE UNIT HYDROGRAPH: A SATISFACTORY MODEL OF WATERSHED RESPONSE,
Massey Univ., Palmerston North (New Zealand). Dept. of Geography.
For primary bibliographic entry see Field 2A.
W75-04344

2F. Groundwater

INTEGRATED SYSTEM IDENTIFICATION AND OPTIMIZATION FOR CONJUNCTIVE USE OF GROUND AND SURFACE WATER, PHASE II,
Case Western Reserve Univ., Cleveland, Ohio. Dept. of Systems Engineering.
For primary bibliographic entry see Field 4B.
W75-03853

STOCHASTIC MODELS FOR THE INTERACTION OF RAINFALL AND GROUNDWATER LEVELS,
Purdue Univ., Lafayette, Ind.
For primary bibliographic entry see Field 2A.
W75-03949

POSSIBLE DEVELOPMENT OF WATER FROM MADISON GROUP AND ASSOCIATED ROCK IN POWDER RIVER BASIN, MONTANA-WYOMING,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 4B.
W75-03972

GEOHYDROLOGIC MAP OF SOUTHERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 7C.
W75-03973

SHALLOW GROUND WATER IN SELECTED AREAS IN THE FORT UNION COAL REGION.
Geological Survey, Helena, Mont.
For primary bibliographic entry see Field 5B.
W75-03974

GEOLOGY AND GROUND-WATER RESOURCES OF GORDON, WHITFIELD, AND MURRAY COUNTIES, GEORGIA,
Geological Survey, Atlanta, Ga.
C. W. Cressler.
Georgia Geological Survey Earth and Water Division Information Circular 47, 1974. 56 p, 11 fig, 3 plate, 7 tab, 20 ref.

Descriptors: *Groundwater, *Water resources, *Georgia, *Hydrogeology, Stratigraphy, Basic data collections, Hydrologic data, Springs, Water wells, Water quality, Water yield.
Identifiers: Gordon County(Ga), Whitfield County(Ga), Murray County(Ga).

Groundwater resources were studied in Gordon, Whitfield, and Murray Counties, Georgia, which lie mainly in the Valley and Ridge physiographic province. Rocks range from Early Cambrian to Mississippian in age. The east edge of the tri-county area extends into the Blue Ridge and Piedmont Provinces and is underlain by metasedimentary and igneous rocks of Precambrian and possible Cambrian age. An inventory of 850 wells revealed that moderately mineralized water in quantities of 3 to 20 gpm suitable for domestic and farm supply can be obtained at depths less than 300 feet nearly everywhere in the three counties, except on steep slopes and narrow ridges. Larger yield industrial or municipal wells have been developed only in small areas underlain by carbonate rocks. Only 16 wells supply more than 50 gpm. The largest yield obtained is 300 gpm for limestone at the top of the Conasauga Formation. In adjacent counties, yields of 300 to 1,000 gpm are produced by wells less than 350 feet deep along the larger intermittent streams that drain the Knox Group. Broad exposures of the Knox in the report area contain many sites that should supply more than 300 gpm. Large supplies of groundwater are available from springs. Twenty-six springs in the area have minimum recorded flows of 200 gpm. Most of the spring water is moderately hard to hard, has a low iron content and can be used with little or no treatment. (Knapp-USGS)
W75-03984

GEOHYDROLOGY OF NEMAHA COUNTY, NORTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
J. R. Ward.
Ground-Water Series No 2, November 1974. 19 p, 10 fig, 3 plate, 2 tab, 15 ref.

Descriptors: *Hydrogeology, *Water resources, *Kansas, Groundwater, Water supply, Water yield, Water wells, Hydrologic data, Alluvium, Sandstones.
Identifiers: *Nemaha County(Kans).

Rocks of Late Pennsylvanian and Early Permian age underlie Nemaha County, Kansas, and are exposed along stream valleys. Glacial deposits of Pleistocene age underlie most of the county and range in thickness from a few feet to 380 feet. A deep valley that is buried by early Pleistocene deposits extends from west to east across the county. Alluvial deposits beneath the terraces and along the present stream valleys are of Illinoisan to Recent age. Wells completed in bedrock formations commonly yield 50 gpm or less. Yields to wells in the glacial deposits that fill the deep buried valley may be as much as 200 gpm. Elsewhere in the country, the glacial deposits generally yield only enough water for relatively small domestic and stock supplies. Wells in alluvial deposits commonly yield 5 to 25 gpm, but yields of as much as 150 gpm are obtained locally. Water in formations of Pennsylvanian age, in most of the glacial deposits, and in the alluvial deposits is classified as a calcium-bicarbonate type. Water in the Permian rocks and in the deeply buried glacial deposits commonly is a calcium-sulfate type. Locally, concentrations of sulfate and nitrate are as much as 2,100 and 490 milligrams per liter, respectively. (Knapp-USGS)
W75-03986

GEOLOGY AND GROUND-WATER RESOURCES OF MONTGOMERY COUNTY, SOUTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
H. G. O'Connor.
Ground-Water Series No 1, September 1974. 12 p, 5 fig, 1 plate, 2 tab, 9 ref.

Descriptors: *Hydrogeology, *Water resources, *Kansas, Groundwater, Water supply, Water yield, Water wells, Hydrologic data, Alluvium, Sandstones.
Identifiers: *Montgomery County(Kans).

In Montgomery County, Kansas, sandstone beds in the Stranger Formation, Stanton Limestone, and Chanute Shale are the most important consolidated-rock aquifers. Locally, wells in the Stranger may yield as much as 20 gallons per minute. Wells in the Chanute may yield as much as 50 gpm. Suitable water for domestic and stock use is obtained from sandstone at depths of 200 to 400 feet. In some parts of the county, groundwater may be moderately saline at depths of 50 feet or less. Fluvial deposits of Quaternary age underlie the stream valleys, and are an important source of groundwater. These deposits yield as much as 100 gpm. The water generally is very hard, but is suitable for domestic and stock use except in local areas where excessive concentrations of sulfate, sodium, and chloride are present. Aquifers in many local areas have been contaminated by brine associated with oil and gas production. The major use of groundwater is for domestic and stock supplies. All of the cities use treated surface water, and water districts obtain surface water to serve much of the rural population. (Knapp-USGS)
W75-03987

IRREVERSIBLE THERMODYNAMIC CONCEPT ON HYDROGEOCHEMICAL TRANSPORT SYSTEMS,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 5B.
W75-04041

WATER RESOURCES EVALUATION OF THE SOUTHERN HIGH PLAINS OF NEW MEXICO,
New Mexico State Univ., University Park. Dept. of Agricultural Economics.
For primary bibliographic entry see Field 4B.
W75-04042

DEGRADATION IN GROUNDWATER AND MOBILITY OF HERBICIDES,
Nebraska Univ., Lincoln. Dept. of Agronomy.
For primary bibliographic entry see Field 5B.
W75-04045

HYDROGEOLOGY OF THE CAREFREE RANCH AREA, MARICOPA COUNTY, ARIZONA,
Arizona Univ., Tucson. Dept. of Geosciences.
J. A. Boyer.
The University of Arizona, Department of Geosciences, 1974 Master's thesis. 75 p, 6 tab, 2 append, 23 fig, 2 map, 24 ref.

Descriptors: *Hydrogeology, *Aquifers, *Groundwater, *Groundwater potential, *Water storage, Groundwater movement, Precambrian era, Tertiary period, Quaternary period, Metamorphic rocks, Alluvium, Permeability, Transmissivity, Gravity studies, Pumping, Geophysics, Structural geology.

The purpose of this study was to define the groundwater availability of the Carefree Ranch area using hydrogeologic methods. The three rock units that crop out in the area are: Precambrian metamorphic rock and granite, Tertiary extrusine volcanic rock, and Quaternary to recent alluvium. The Precambrian rocks are essentially impervious. The Tertiary volcanic rocks are a potential water source, but have not yet been drilled to determine their capacity. The valley-fill alluvium, which is considered to be the best potential aquifer in the ranch area produces 50 to 225 gpm. Gravity data indicate that the basin containing the valley-fill alluvium is 7000 feet deep, and using a minimum storage coefficient of 0.07, is estimated to contain a maximum figure of 45,000 acre feet of available water. A more detailed study will be required to determine exact locations for future well sites. (Mastic-Arizona)
W75-04145

METHODS FOR ESTIMATING TRANSPORT MODEL PARAMETERS FOR REGIONAL GROUNDWATER SYSTEMS,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
S. W. Ahlstrom, R. J. Serne, R. C. Routson, and D. B. Cearlock.
Available from the National Technical Information Service, Springfield, Va. 22161, as BNWL-1717, $4.00 paper copy, $2.25 microfiche. Report No BNWL-1717, 1974. 23 p, 6 fig, 3 tab, 5 ref, 1 append. AEC Contract AT (45-1)-2130.

Descriptors: *Methodology, *Estimating equations, Groundwater, *Dispersion, *Sorption, Transport depletion, Water quality, Model studies, Hydrologic models, Analytical models, Hydrologic data, Aquifers, *Groundwater movement, Hydraulic conductivity, Diffusion, *Path of pollutants.

Identifiers: *Convection-diffusion equation, Transport models, Hanford groundwater system.

The measurement of dispersion and sorption coefficients to the degree of detail required by a calculated transmissivity (or permeability) for the unconfined aquifer beneath the Hanford Reservation would be extremely expensive and time-consuming, if not impossible. As an alternative, methodologies were developed for estimating dispersion and sorption coefficients from correlations with characteristic soil properties. Preliminary correlations were proposed and contour maps of dispersion and sorption coefficients for the Hanford aquifer as determined from these correlations were presented. (Prickett-ISWS)
W75-04271

IDENTIFICATION OF A DISTRIBUTED PARAMETER SYSTEM IN HYDROLOGY,
California Univ., Berkeley. Operations Research Center.
A. Rath.
Available from the National Technical Information Service, Springfield, Va. 22161, as AD-781 524, $6.25 paper copy, $2.25 microfiche. Research Report No. 74-15, May 1974. 141 p, 9 fig, 5 tab, 71 ref, 2 append. NSF Grant GP-30961X2.

Descriptors: *Groundwater resources, *Hydrologic systems, *Subsurface waters, *Aquifer systems, *Simulation analysis, Groundwater movement, Hydrogeology, Hydrology, Water resources, Optimization, Mathematical models, Aquifer characteristics, Aquifer management, Parametric hydrology, Transmissivity, Computer models, Computer programs, Digital computers, Numerical analysis, Finite element analysis.
Identifiers: Parabolic partial differentials, Newton method, Gauss-Newton method.

The determination of the unknown functions governing aquifer behavior, especially the transmissibility function, was studied. The behavior of the aquifer was considered to be governed by a two-dimensional linear parabolic differential equation. The inverse or identification problem was to determine the unknown functions in the above differential equation by observations on the aquifer potentials. The identification of the unknown transmissibility function was formulated in a variational framework and consisted of minimizing a certain error functional. The above problem was not well posed without restrictions on the function spaces. The transmissibility function was restricted to a certain class and was approximated by combination of piecewise bilinear functions. The degree of detail of the approximation was made to depend on the available data. Numerical procedures were provided for the solution of the partial differential equation and the above minimization problem. The procedure outlined was used on examples and the results were presented to demonstrate the feasibility and usefulness of the approach. (Terstriep-ISWS)
W75-04280

SECOND-ORDER THEORY OF FLOW IN THREE-DIMENSIONAL DEFORMING MEDIA,
Centro di Ricerca IBM di Venezia (Italy).
G. Gambolati.
Water Resources Research, Vol 10, No 6, p 1217-1228, December 1974. 15 fig, 44 ref, 1 append.

Descriptors: *Groundwater movement, *Land subsidence, *Compaction, *Mathematical studies, *Unsteady flow, *Aquifers, Equations, Numerical studies, Artesian aquifers, Groundwater mining, Pore water, Overdraft, Sediments, Subsidence, Pore pressure.
Identifiers: *Three-dimensional flow, Horizontal soil displacement, Noordbergum effect.

A basic assumption in groundwater flow theory is that consolidation occurs in the vertical direction only. In real three-dimensional media this condition is not satisfied a priori. A second-order theory of flow was developed including the consideration of horizontal soil displacements. The 'strain nucleus' or 'tension center' approach, well-known in thermoelasticity was used. The formulation of the theory showed that volume strain in a point P of the system could be viewed as being distinctly contributed by pore pressure variations in and outside P. The latter contribution, which vanishes identically in one-dimensional media, was called the 'three-dimensional effect.' Solutions applied to a semi-infinite mechanically homogeneous medium showed that the three-dimensional effect was negligible and the diffusion equation was good as long as the ratio W between the average depth and the thickness of aquifer is greater than or equal to Z, whatever its areal exent. If W is less than 2 (shallow and thick aquifers), the above effect produces an additional compression of soil during an intermediate stage after pumping began and hence a slowing down of the rate of pressure head decline, as has been predicted by standard solutions. The most critical conditions occur for W = 1/2, i.e., in unconfined aquifers. The present theory allowed for a short qualitative analysis of the 'Noordbergum effect' or reverse water level fluctuations. (Prickett-ISWS)
W75-04308

THE SHAPE OF THE INTERFACE IN STEADY FLOW IN A STRATIFIED AQUIFER,
Technion - Israel Inst. of Tech., Haifa (Israel). Dept. of Civil Engineering.
Y. Mualem, and J. Bear.
Water Resources Research, Vol 10, No 6, p 1207-1215, December 1974. 12 fig, 1 tab, 8 ref.

Descriptors: *Groundwater movement, *Saline water-freshwater interfaces, *Stratification, *Steady flow, Equations, Model studies, Coasts, *Aquifers, *Saline water intrusion, Water pollution sources, Encroachment, Sea water, Seepage, Mathematical studies, Dupuit-Forchheimer theory, Artificial recharge, Confined water, Analytical techniques.
Identifiers: *Hele-Shaw models, Israel, Semipervious layers, *Coastal aquifers.

The shape of the interface in a coastal aquifer in which a thin horizontal semipervious layer is present was studied. Field obsrevations and laboratory experiments showed that under these conditions a discontinuity in the shape of the interface occurs such that a freshwater region exists under the semipervious layer while immediately above it, saline (or mixed) water is present in the aquifer. An approximate solution was presented for the shape of the interface below the semipervious layer and for the extent of the freshwater region above it under steady state conditions. The solution was based on the Dupuit assumption and on a linearization of part of the flow equations. Laboratory experiments on a Hele-Shaw model showed a good agreement between the forecasted interface profiles and those actually observed in the model. From the results of the experiments it follows that the separation of the interface into two parts, below and above the semipervious layer, decreases as the length of landward seawater intrusion increases. The proposed solution can readily be applied to the case of a phreatic surface under an artificial recharge basin when the aquifer is separated into subaquifers by a sequence of semipervious layers. (Prickett-ISWS)
W75-04329

RISE AND DECLINE OF THE WATER TABLE INDUCED BY VERTICAL RECHARGE,
California Univ., Davis.
M. A. Marino.
Journal of Hydrology, Vol 23, No 3/4, p 289-298, 1974. 1 fig, 9 ref.

Descriptors: *Water table, *Recharge, *Drains, *Deep percolation, Dupuit-Forchheimer theory, *Groundwater movement, Saturated flow, Hydraulic properties, Mathematical models, Water table aquifers, Analytical techniques, *Aquifers.
Identifiers: Boundary-valve problems.

Analytical expressions were presented for the water-table rise and decline in an unconfined aquifer bounded by two streams or drains and receiving vertical recharge. In addition, expressions for the maximum height of the water table were included. The water levels in the drains were considered to be at equal elevation. Two types of recharge were treated: time-varying and uniform. The solutions were expressed in terms of the head averaged over the depth of saturation. A judicious choice of the weighted mean of the depth of saturation was necessary in all applications of the solutions presented. For instance, the water-table profiles were calculated by the method of successive approximations. The weighted mean of the depth of saturation during a period of flow was taken as a first approximation equal to the initial depth of saturation. The first approximation of the height of the water table was then calculated. In the second trial the weighted mean depth was approximated by the average of the initial depth of saturation and the first approximation of the height of the water table. The procedure was repeated until the value of the calculated height of the water table converged. (Visocky-ISWS)
W75-04333

MODELS OF DISPERSION IN A GRANULAR MEDIUM,
California Univ., Davis.
M. A. Marino.
Journal of Hydrology, Vol 23, No 3/4, p 313-318, 1974. 10 ref, 1 append.

Descriptors: *Dispersion, *Porous media, *Adsorption, Mass transfer, Dissolved solids, Velocity, Convection, Analytical techniques, Solutes, *Groundwater movement, *Mathematical models, Seepage, Model studies, Path of pollutants.

Mathematical models were developed for dispersion problems within a saturated granular medium in a unidirectional flow field in which the concentration of the displacing fluid was considered to be a function of time. The medium was assumed to be homogeneous, isotropic, and semi-infinite in areal extent. The effect of adsorbing and non-adsorbing granular media was taken into account. The models are useful for predicting the concentration of contaminants in representative field problems. (Visocky-ISWS)
W75-04340

2G. Water In Soils

APPLICATION OF SURFACE MODERATORS TO MEASUREMENT OF WATER CONTENT IN FIELD TOPSOILS WITH A NEUTRON MOISTURE DEPTH GAUGE,
Commonwealth Scientific and Industrial Research Organization, Canberra (Australia). Div. of Plant Industry.
E. W. Pook, and T. Hall.
Field Station Record, Division of Plant Industry, CSIRO (Australia), Vol 13, No 1, p 31-42, 1974. 6 fig, 1 tab, 6 ref.

Descriptors: *Neutron meters, *Calibrations, *Soil moisture meters, *On-site tests, *Topsoils, Moisture content, Measurement, Forest soils, Soil surfaces, Plastics, Cadmium.
Identifiers: Surface moderators.

Surface moderators are considered for use with neutron moisture gauges in order to extend the application of the normal soil calibration to gauge measurements made at relatively shallow depths, and to help maintain or improve the precision of

measurements related to discrete toposil layers over a useful range of soil moisture contents. The effectiveness of a polythene surface shield along and in combination with each of two sizes of cadmium annulus as surface moderators in moderately heteorogeneous forest toposils under field conditions has been assessed. The polythene shield with a small cadmium annulus was found to be most successful in extending the range of the normal soil calibration to data obtained at 10 cm depth. Gauge estimates of water content to that depth were related with good precision to mean moisture content of the top 20 cm of soil in the range from 6% to 22% water by volume. Changes in mean moisture content of the top 20 cm layer of soil may be monitored with acceptable accuracy without surface moderators, using the normal gauge calibration. (Levick-CSIRO)
W75-03940

EFFECT OF SULFURIC ACID AND SULFUR DIOXIDE ON THE AGGREGATE STABILITY OF CALCAREOUS SOILS,
UArizona Univ., Tucson Dept. of Soils, Water and Engineering.
S. Miyamoto, H. L. Bohn , J. Ryan, and M. S. Yee.
Soil Science, Vol. 118, No. 5, Nov. 1974, p 299-303. 2 tab, 3 fig, 12 ref.

Descriptors: *Soil aggregates, *Soil erosion, *Soil stability, *Sulfur compounds, *Carbonates, *Atmospheric fallout, Soil temperatures, Calcareous soils, Druing, Southwest U. S., Silts.
Identifiers: Sulfuric acid, Sulfur dioxide.

Soils are being increasingly exposed to sulfuric acid (H_2SO_4) and sulfur dioxide (SO_2), both common waste products from smelting, fossil fuel combustion, and other industrial activities. The proper use of sulfuric acid can contribute to increased productivity in calcareous and sodic-calcareous soils. The water-stable soil aggregates were measured for two sodic-calcareous and six calcareous soils treated with H_2SO_4 and SO_2. The amount of sulfur which may cause significant reduction in aggregate stability depends on the soil basicity. Drying of the soils further destroyed the aggregates, probably by enhancing the reactions with H_2SO_4. The sorption of SO_2 from moist streams also reduced aggregate stability, but to a lesser degree than an equivalent amount of H_2SO_4. It is uncertain whether the aggregate destroyed by this process contributes to increasing soil erosion. (Mastic-Arizona)
W75-03952

DUNE SAND STABILIZATION WITH SYNTHETIC SOIL CONDITIONERS: A LABORATORY EXPERIMENT,
Ghent Rijksuniversiteit (Belgium). Soil Physics, Soil Conditioning and Horticultural Soil Sciences Lab.
D. Gabriels, M. De Boodt, and D. Minjauw.
Soil Science, Vol. 118, No. 5, November, 1974, p 332-338. 7 tab, 3 fig, 10 ref.

Descriptors: *Dune sands, *Rainfall, *Infiltration, *Soil surface.s, *Erosion control, Raindrops, Rainfall simulators, Asphalt, Moisture content, Rainfall intensity, Runoff, Erosion.
Identifiers: *Splash erosion, Polyvinyl acetate, Polyacryl amide.

Dune sand was subjected to a range of rain intensities from which a linear relationship was found between the side splash erosion and the kinetic energy of the rainfall. This relationship was used to study the influence of different amounts of chemicals sprayed as a mulch or mixed with the top layer of sand in order to stabilize this sand under raindrop action. Polyvinyl acetate, polyacryl amide with a cross-linker, and an asphalt emulsion applied at proper rates can be used for dune sand stabilization. Further studies are needed to determine the toxicity of these treatments to plants, and to see if seeds can germinate through the soil conditioner film. (Mastic-Arizona)
W75-03953

EFFECT OF SOIL TEMPERATURE ON DIRECTION OF CORN ROOT GROWTH,
Ontario Ministry of the Environment, Toronto.
For primary bibliographic entry see Field 3F.
W75-03954

MECHANISTIC RESPONSE OF EXPANSIVE CLAYS,
Indian Inst. of Tech., Madras, Soil Engineering Lab.
K. S. Sankaran, and Rao D. Venkateshwar.
Soil Science, Vol 118, No. 5, Nov, 1974. p 289-298, 2 tab, 1 fig, 42 ref.

Descriptors: *Clay minerals, *Clays, *Compressibility, Montmorillonite, Model studies.
Identifiers: *Clay-water system, Swelling.

A microscopic model of expansive clay-water systems was developed based upon a critical examination of the literature. A mechanistic response of expansive clays is also presented. Clays may be in the form of clay platelets, clay crystals, clay aggregates, clay congolmerates, or any combination of these depending upon environmental conditions and the purity and type of the clay mineral. The compressibility characteristics of the clay and water system have been grouped into three pressure ranges: initial, intermediate, and final stage of compression. An analysis of existing data on compression and rebound characteristics was made for sodium and calcium montmorillonitic clays. The analysis conformed to the microscopic model of clay and the postulation with regard to the mechanistic response of expansive clays under pressure. (Mastic-Arizona)
W75-03955

STEADY FLOWS OF WATER AND SALT IN UNIFORM SOIL PROFILES WITH PLANT ROOTS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
For primary bibliographic entry see Field 2I.
W75-03956

THE THREE STAGES OF DRYING A FIELD SOIL,
Agricultural Research Service, Phoenix, Ariz., Water Conservation Lab.
For primary bibliographic entry see Field 2D.
W75-03965

EFFECT OF SOIL MOISTURE REGIMES, PHOSPHORUS AND NITROGEN ON N AND P UPTAKE BY BARLEY (HORDEUM VULGARE L.),
Haryana Agricultural Univ., Hissar (India).
For primary bibliographic entry see Field 3F.
W75-03991

NITRATE AND CHLORIDE ACCUMULATION AND DISTRIBUTION IN FERTILIZED TILE-DRAINED SOILS,
Minnesota Univ., St. Paul. Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W75-04022

SOIL ADSORPTION OF HUMIC COLOR,
Nebraska Univ., Lincoln. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5D.
W75-04043

ACCUMULATION OF STRONTIUM-90 IN SOILS,
For primary bibliographic entry see Field 5B.
W75-04062

CESIUM-137, STRONTIUM-90, AND LEAD-210 IN SOIL OF THE FAR NORTH REGIONS,
For primary bibliographic entry see Field 5B.
W75-04063

COMPARATIVE DISTRIBUTION OF STRONTIUM-90 AND CESIUM-137 IN DIFFERENT TYPES OF SOILS,
For primary bibliographic entry see Field 5B.
W75-04064

DISTRIBUTION AND MIGRATION OF STRONTIUM-90 IN SOILS,
For primary bibliographic entry see Field 5B.
W75-04065

ASSESSMENT OF RADON EMANATION FROM THE SURFACE OF EXTENSIVE TERRITORIES,
For primary bibliographic entry see Field 5B.
W75-04090

GRAPHOANALYTICAL METHOD FOR DETERMINING CESIUM-137 CONCENTRATION IN SOIL SAMPLES FROM THE GAMMA SPECTRUM,
For primary bibliographic entry see Field 5A.
W75-04101

FLUE-CURED TOBACCO YIELD AND OXYGEN CONTENT OF SOIL IN LYSIMETERS FLOODED FOR VARIOUS PERIODS,
Agricultural Research Service, Florence, S.C. Coastal Plains Soil and Water Conservation Research Center.
For primary bibliographic entry see Field 3F.
W75-04111

THE EFFECT OF GYPSUM TREATMENT ON THE SWELLING OF NATURAL CLODS OF A CLAY SOIL,
Commonwealth Scientific and Industrial Research Organization, Deniliquin (Australia). Div. of Plant Industry.
B. J. Bridge, and J. Tunny.
Soil Science, Vol 115, No 6, June 1973. p 414-419, 4 fig, 1 tab, 18 ref.

Descriptors: *Clays, *Porosity, *Soil moisture, *Wetting, *Soil treatment, Gypsum, Sodium, Calcium, Infiltration, Bulk density, Moisture content, Soil horizons, Submergence, Soil texture, Impervious soils.
Identifiers: Distilled water.

Three treatments were applied to clods of clay soil to reduce swelling and improve water entry. The treatments were: first, wetting with distilled water; second, wetting with saturated gypsum solution; and third, wetting with distilled water following gypsum treatment. The gypsum treatment limited the amount of swelling in the clods as a result of replacement of sodium ions with calcium ions on the clay exchange sites. The gypsum treatment also improved the air-filled pore space in clods from the B horizon with a 59 percent clay content. Investigations of the pore-space relations and swelling properties in A and B horizons of the clay soil clods were made using a saran resin coating technique. (Mastic-Arizona)
W75-04132

A FLOTATION METHOD FOR THE RAPID MEASUREMENT OF THE WET BULK DENSITY OF SOIL CLODS,
National Inst. of Agricultural Engineering, Penicuik (Scotland).
D. J. Campbell.
J Soil Sci, Vol 24, No 2, p 239-243, 1973.
Identifiers: *Clods(Soil), Coating, *Flotation method, Immersion, Measurement, Resin, Soils, Wet bulk density, *Soil density.

The clods are sprayed with a waterproof coating of a resin and then immersed sequentially in liquids of different specific gravity. It is compared with the wax coating method for a selection of soil textures and moisture contents and shown to be 10 times as rapid when used to measure wet bulk density with an accuracy of plus or minus 0.05 g/cm cu. The flotation method was used to show that, for 3 contrasting soils, clod wet bulk density is independent of clod size.--Copyright 1974, Biological Abstracts, Inc.
W75-04135

INFLUENCE OF IRRIGATION WATER QUALITY ON EXCHANGEABLE SODIUM PERCENTAGE IN A SODIC SOIL,
Uttar Pradesh Agricultural Univ., Pantnagar (India).
B. S. Rawat, and T. A. Singh.
Annals of Arid Zone, Vol 13, No 1, March, 1974. p 39-46, 1 fig, 3 tab, 10 ref.

Descriptors: *Irrigation water, *Water quality, *Percolation, *Soil water, *Soil chemical properties, Sodium, Calcium, Magnesium, Leaching, Electrolytes, Permeability, Soils, Salts, Conductivity.
Identifiers: SAR(Sodium absorption ratio), ESP(Exchangeable sodium percentage).

Studies using different quality irrigation waters showed that more efficient leaching was accomplished with waters of high electrolyte concentrations and low sodium absorption ratio (SAR) values. Greater amounts of water with high SAR are required to remove a given amount of salt than water with a low SAR. In order to reclaim a sodic soil having a high exchangeable sodium percentage (ESP), leaching should be carried out with waters of high electrolytic concentrations and low SAR values. Such waters will improve permeability as well as facilitate leaching. ESP values will be lower in the upper layers compared to the lower layers of the soil because of the smaller amounts of calcium and magnesium that remain in the percolating solution to effect sodium exchange in the lower layers. (Mastic-Arizona)
W75-04136

COMPARISON OF SOME METHODS FOR DETERMINING ORGANIC PHOSPHORUS IN SOME NIGERIAN SOILS,
Institute for Agricultural Research, Zaria (Nigeria).
W. B. Ipinmidun.
Soil Science, Vol 115, No 4, April 1973. p 324-325, 2 tab, 7 ref.

Descriptors: *Phosphorus compounds, *Organic compounds, *Soil types, *Hydrolysis, *Soil texture, Solubility, Hydrogen ion concentration.
Identifiers: *Nigeria.

The purpose of this study was to find the method that would give the best approximation of the organic phosphorus in a variety of soils and also lend itself to rapid routine determination. Samples were analyzed using the ignition methods of Sauders and Williams (J. Soil Science 6:254-267, 1955), and of Legg and Black (Soil Sci. Soc. Am. Proc 19:139-143, 1965); and extraction methods of Mehta, Legg, Goring, and Black (Soil Sci Soc. Am. Proc. 18:443-449, 1955), and Harrap (J. Soil Sci 14:82-87, 1963). Results showed agreement between the Mehta et al and Harrap extraction methods and the Legg and Black ignition method. Therefore the convenience and speed, along with the accuracy of organic phosphorus determination, commend the Legg and Black ignition method for use in routine analysis on soils similar to the ones used in the study. (Mastic-Arizona)
W75-04139

DISTRIBUTION OF BORON IN SALT AFFECTED AND CONTIGUOUS NORMAL SOILS,
Central Soil Salinity Research Inst., Karnal (India).
G. P. Bhargava, S. K. Singhla, and I. C. Gupta.
Annals of Arid Zone, Vol 13, No 1, March 1974. p 32-38, 4 tab, 14 ref.

Descriptors: *Saline soils, *Sodium, *Boron, *Saline water, Chlorides, Carbonates, Bicarbonates, Hydrogen ion concentration, *Leaching, Soil profiles, Soil properties, Electrical conductance, Toxicity.

An attempt was made in this study to correlate boron in saturated soil extracts to various soil characteristics including ESP (exchangeable sodium percentage), soluble sodium carbonate, and chloride ions. A number of soil profiles were sampled having a wide variety of different soil characteristics. In the saline-sodic type soils, boron was found to be positively correlated with pH, ECe (electrical conductivity), ESP, sodium, carbonate, chloride and bicarbonate ions, but no such correlation was discovered in normal and chloride type soils. The reason for the poor correlation between boron and the various soil characteristics in the chloride and normal type soils was not clear. More efficient leaching and small amounts of exchangeable sodium in these soils were considered as possible reasons. (Mastic-Arizona)
W75-04141

EVALUATION OF EDDHA AS AN EXTRACTION AND ANALYTICAL REAGENT FOR ASSESSING THE IRON STATUS OF SOILS,
Nevada Agricultural Experiment Station, Reno.
G. V. Johnson, and R. A. Young.
Soil Science, Vol 115, No 1, January 1973. p 11-17, 1 fig, 5 tab, 21 ref.

Descriptors: *Iron, *Calcareous soils, *Acidic soils, *Spectrophotometry, Organic matter, Analytica techniques, Hydrogen ion concentration, Photosynthesis.
Identifiers: EDDHA(Ethylene di(O-hydroxyphenylacetic acid)), Iron chlorosis.

Crops growing on calcareous soils as well as many acid soils are subject to iron chlorosis. The effectiveness of EDDHA (ethylene di(O-hydroxyphenylacetic acid)) as an extraction and analytical reagent for assessing the iron status of soils was studied. Results of the study show EDDHA has potential as an extracting iron that is related to the metabolically active iron in the plant. Direct spectrophotometric analysis of EDDHA extracts yielded high results because of light absorption by soil organic matter. Procedures are outlined which can eliminate this error, which is considered minor because it was relatively constant for all soils analyzed. The methods using EDDHA offer an economic advantage over other methods and could be adapted for routine laboratory use. (Mastic-Arizona)
W75-04144

USE OF A MICROWAVE REMOTE SENSOR FOR DETERMINATION OF WATER IN SUBSOILS,
Missouri Univ., Rolla. Dept. of Electrical Engineering.
B. K. Park, J. E. Adair, and C. McDowell.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 255, $3.75 in paper copy, $2.25 in microfiche. Missouri Water Resources Research Center, Columbia, Completion Report, August 1974. 40 p, 8 fig, 5 tab, 2 ref. OWRT A-070-MO(1). 14-31-0001-4025.

Descriptors: Soils, *Remote sensing, *Soil moisture, Measurement, Analytical techniques, Soil properties, Soil analysis, *Subsoil, Microwaves.
Identifiers: *Microwave remote sensing devices.

Laboratory equipment using a microwave remote sensor was developed for measuring the amount of moisture in different soil materials. A technique based on the measurement of the microwave transmission properties of samples located within a waveguide was used and the frequency used was 10.525 GHz. Input impedance was measured by slotted line techniques. Calculations of the complex dielectric constant were made for each measured value of the complex propagation constant to provide a comparison with measured values of various soils. Evaluations were made for the use of passive and active microwave remote sensing devices for water content of soils under different conditions. Additional studies are needed to determine accuracy for measuring moisture in subsoils.
W75-04149

NITRIFICATION IN SOIL-WATER SYSTEMS: A COMPUTERIZED ACTIVATED COMPLEX MODEL,
Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
For primary bibliographic entry see Field 5B.
W75-04235

THE APPROXIMATE PROBABILITY DENSITY FUNCTION OF RANGE AND ADJUSTED RANGE,
National Energy Authority, Bangkok (Thailand).
For primary bibliographic entry see Field 6A.
W75-04246

EXPERIMENTAL METHODS FOR OBTAINING PERCOL MODEL INPUT AND VERIFICATION DATA,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
For primary bibliographic entry see Field 5B.
W75-04276

LYSIMETRIC AND CHEMICAL INVESTIGATIONS OF PEDOLOGICAL CHANGES: I. LYSIMETERS AND THEIR DRAINAGE WATERS,
Missouri Univ., Columbia.
W. J. Upchurch, M. Y. Chowdhury, and C. E. Marshall.
Soil Sci. Vol 116, No 4, p 266-281. 1973, Illus.
Identifiers: *Beidellite, Cations, Chemicals, Drainage, *Lysimeters, Minerals, *Pedological changes, *Soil profiles, X-ray diffraction, Clays, Loam.

Twenty-four filled-type lysimeters with associated plots on the Mexico silt loam soil were studied over the period April 1963-Nov. 1969. Additions of 5 cations as carbonatesor bicarbonates, Ca, Mg, Na, K, and NH4, were made at 2 depths, 4-12 in. and 16-24 in., in cropped and uncropped series. The drainage waters from the lysimeters were collected, measured and analyzed for Ca, Mg, Na, K, Si, Al and Cl. In the fallow series, 2.67-15.29% of the rainfall appeared as drainage; the grass series gave 0-4.48% (mean annual rainfall was 38 in., well distributed). Chloride added initially in the top of 4 in. of the soil was recovered in 1- over 5 yr, the lysimeter showing the greatest throughput of water giving the most rapid loss. The soil profile was characterized by determinations of exchangeable cations and exchange capacity at different depths, and by X-ray diffraction on 2 fractions of the clay, 2 micro-0.2 micro and less than 0.2 micro. The dominant clay mineral is beidellite. A mixed layer of mica-beidellite is also present. Kaolinite occurs in very small amounts, especially in the fine fractions. The 0.7 in. surface layer contains less well-defined beidellite than the lower horizons. Cationic ratios such as Na/K and Mg/Ca showed significant variations with depth. The data for Mg, Na, K, pH and SiO2 from successive lysimeter samples were plotted on Garrels and Christ diagrams. For Mg the points lie close to the beidellite-kaolinite boundary, Na and K are in the

kaolinite area. Comparison with results for equilibrated soil samples from the 28-32-in. layer showed poor agreement. The gravel layer in the lysimeter had cation exchange properties different from those of the lowest layer of soil. It was therefore insufficiently inert.--Copyright 1974, Biological Abstracts, Inc.
W75-04311

EVALUATION OF CRITERIA FOR SEPARATING SOILS WITH XERIC AND UDIC MOISTURE REGIMES,
Bureau of Land Management, Portland, Oreg.
B. R. Thomas, G. H. Simonson, and L. Boersma.
Soil Sci Soc Am Proc. Vol 37, No 5, p 738-741. 1973, Illus.
Identifiers: Cambial, Criteria, *Moisture depletion, Soil classification, Pseudotsuga-Menziesii, Soils, *Udic moisture regime, *Xeric moisture regime, *Soil moisture, *Soil water suction, *Oregon, Soil-water-plant relationships.

Criteria for classifying soil series in the Coast Range Mountains of western Oregon into categories with xeric and udic moisture regimes were evaluated. Relationships among soil-water suction, plant-water suction, and cambial activity of Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) were also evaluated. Soil-water content was measured with gypsum blocks. Plant-water suction of Douglas-fir branch tips was measured with a pressure bomb. These measurements were taken early in the morning at least once every 10 days. Experimentals sites were selected on 3 soil series and 1 north slope soil phase tentatively classified as xeric and on 4 soil series tentatively classified as udic. The 4 study sites in the xeric zone had soil-water suctions equal to or greater than 15 bars within the soil-water control section for at least 60 consecutive days. None of the 4 study sites in the udic zone were dry that long. Cumulative water deficit in the xeric zone was about 75% of the seasonal total when the entire soil-water control section attained 15 bars. Almost all available water was removed from the upper third of the profile in the xeric zone when the trees stopped producing springwood. Much less water was removed from the upper third of the profile in the udic zone. The same relationship held true for the available water in the entire profile at time of dormancy. Trees in the xeric zone produced springwood of 23 more days and have 26 more days total growing time than trees in the udic zone. Changes of soil and plant-water suction with time showed similar patterns but different magnitudes. Plant-water suction cannot be used in lieu of soil-water suction for purposes of soil classification.--Copyright 1974, Biological Abstracts, Inc.
W75-04312

TEMPERATURE REGIMES AND CLASSIFICATION OF SOME WELL-DRAINED ALPINE SOILS IN ALASKA,
Soil Conservation Service, Palmer, Alaska.
S. Rieger.
Soil Sci Soc Am Proc. Vol 37, No 5, p 806-807. 1973.
Identifiers: *Alaska, *Alpine soils, Pergelic temperature regime, *Soil terperature, *Soil classification, Soil drainage.

Temperatures at a depth of 50 cm were taken in 4 well-drained alpine soils of interior and south-central Alaska (USA) over a 3 yr period. The soils of the interior, under a strongly continental climate, have a pergelic temperature regime, but those of coastal mountain under a cool maritime climate do not.--Copyright 1974, Biological Abstracts, Inc.
W75-04314

EFFECT OF LEVEL TERRACES ON SOIL MOISTURE CONTENT AND UTILIZATION BY CORN,
Iowa State Univ., Ames.
For primary bibliographic entry see Field 3F.
W75-04315

EFFECT OF TRACTOR TRAFFIC, SURFACE MULCH AND SEEDBED CONFIGURATION ON SOIL PROPERTIES,
Agricultural Research Service, Big Spring, Tex.
For primary bibliographic entry see Field 3F.
W75-04316

EFFECTS OF NATURAL MICROBIAL PREPARATIONS ON THE ELECTROKINETIC POTENTIAL OF BACTERIAL CELLS AND CLAY MINERALS,
New York Univ., N.Y. Dept. of Biology.
For primary bibliographic entry see Field 5B.
W75-04317

EFFECT OF MOISTURE REGIMES AND GREEN MANURING ON FERROUS IRON CONCENTRATION IN SOIL AND GROWTH AND YIELD OF PADDY,
Illinois Univ., Urbana.
For primary bibliographic entry see Field 3F.
W75-04318

LOESS DISTRIBUTION ON A WISCONSIN-AGE TILL PLAIN IN SOUTHWESTERN OHIO,
Landmark, Inc., Columbus, Ohio.
A. G. Hock, L. P. Wilding, and G. F. Hall.
Soil Sci Soc Am Proc. Vol 37, No 5, p 732-738. 1973, Illus.
Identifiers: *Carbonates, *Loess distribution, *Ohio, *Soil types, Till plains, Topography, Variability, Surface elevation, Soil classification.

Loess thickness, depth to carbonates, nature of loess-till contact, soil type and surface elevation were observed at 15 m (or alternatively 30 m) intervals along 8.5 km of pipeline trench wall; similar observations were made at 4.6 m intervals in 3 41 m x 41 m grid sites each containing 100 observation points. Over 800 observations were made. Data were statistically summarized according to soil drainage classes (landscape position) and glacio-physiographic regions. Loess blankets the landscape, but is usually thickest on poorly-drained landscape positions and, except for local pockets, thins or becomes absent on slopes more than 5%. Local distribution of loess is highly variable over horizontal distances of 7.5 m or less and is directly related to the irregular microtopography of the underlying till surface. Construction of a loess isopachous map for this area was deemed impractical because of the large number of observations that would be required to estimate mean loess thickness classes within relatively narrow limits (plus or minus 20%), even on relatively stable geomorphic areas. No source area(s) could be identified for these loess deposits based on loess thickness or particle-size parameters.--Copyright 1974, Biological Abstracts, Inc.
W75-04320

ISOLATED SOIL COLUMNS FOR PLANT RESEARCH: PROCEDURE AND UNIFORMITY TRIAL,
Agricultural Research Service, Logan, Utah.
For primary bibliographic entry see Field 3F.
W75-04321

LYSIMETER INSTALLATIONS IN SANDSTONE AT STYRRUP, NOTTINGHAMSHIRE,
Institute of Geological Sciences, London (England). Dept. of Hydrogeology.
R. Kitching, and L. R. Bridge.
Journal of Hydrology, Vol 23, No 3/4, p 219-232, 1974. 7 fig, 2 tab, 2 ref.

Descriptors: *Lysimeters, *Sandstones, Neutron activation analysis, Groundwater, Infiltration, Permeability, Observation wells, Boreholes, Membranes, Instrumentation, Measurement, Pumping.
Identifiers: *Neutron probes, *Bunter Sandstone(UK).

The construction and operation were described of two relatively large lysimeters installed to measure the infiltration from rainfall on undisturbed blocks (100 sq m) of Bunter Sandstone in north Nottinghamshire, England. The lysimeters were surrounded by impermeable membranes installed in trenches to minimize disturbance of the adjacent strata and grouted into the impermeable marl below the base of the sandstone. A dewatering borehole in each lysimeter kept the water levels inside and outside equal. During 1972 pumping tests were carried out on each lysimeter to determine the rate of leakage under known head conditions. Leakage varied from 0.00417 to 0.00554 cm water/day/cm head. Moisture contents inside and outside the lysimeters were measured with neutron probes. (Roberts-ISWS)
W75-04332

A GAMMA TRANSMISSION METHOD FOR THE DETERMINATION OF MOISTURE CONTENT IN SOILS,
Uttar Pradesh Irrigation Dept., Locknow (India).
R. S. Saksena, S. Chandra, and B. P. Singh.
Journal of Hydrology, Vol 23, No 3/4, p 341-352, 1974. 10 fig, 2 tab, 4 ref.

Descriptors: *Nuclear moisture meters, *Gamma rays, *Soils, *Clays, *Moisture content, Moisture, Soil moisture, *Soil moisture meters, Instrumentation, Soil density, Aquifers, Radiation, Stratification, Attenuation, Nuclear physics.
Identifiers: *Gamma transmission method, Nonsaturated soils.

Soil samples from strata down to 164 m were studied with respect to the linear attenuation coefficient (mu) and the mass absorption coefficient (mu/rho) for gamma rays and their variation with moisture content. Details were given for three samples examined. The variation of gamma counting rate with moisture for different thicknesses of strata was also given. The reaction of clay samples was determined by the gamma transmission method and the explanation of such reaction was given. It was suggested that stratification can also be determined by this method with the aid of the gamma-ray linear attenuation coefficient, which would also provide a method for the determination of the density of the soils in the various strata. The method was also suggested for the study of seasonal variation of moisture content. (Prickett-ISWS)
W75-04343

EFFECT OF STORED SOIL MOISTURE RESERVE THROUGH CONSERVATION PRACTICES AND SUPPLEMENTAL IRRIGATION ON WHEAT YIELD UNDER DRYLAND FARMING CONDITION,
Indian Agricultural Research Inst., New Delhi (India).
For primary bibliographic entry see Field 3F.
W75-04346

SULFATE REDUCTION AND SULFIDE OXIDATION IN FLOODED SOIL AS AFFECTED BY CHEMICAL OXIDANTS,
Army Engineer Waterways Experiment Station, Vicksburg, Miss. Office of Dredged Material Research.
For primary bibliographic entry see Field 5B.
W75-04347

CONVERSION OF DDT TO DDD IN FLOODED SOIL,
Bangladesh Agricultural Univ., Mymensingh. Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W75-04348

2H. Lakes

LAKES OF OREGON: VOLUME 2. BENTON, LINCOLN, AND POLK COUNTIES,
Geological Survey, Portland, Oreg.
M. V. Shulters.
Open-file report, 1974. 71 p, 5 fig, 1 tab.

Descriptors: *Lakes, *Oregon, *Data collections, Limnology, Basic data collections, Water quality, Lake morphology
Identifiers: Benton County(Oreg), Lincoln County(Oreg), Polk County(Oreg).

An inventory of lakes and reservoirs of Benton, Lincoln, and Polk Counties, Oregon, is presented. Information is provided for use by city, county, and State planning groups as well as for sportsmen, tourists, and others interested in preserving the recreational value of Oregon's lakes. In addition to office compilation of existing data, most lakes were also visited. Visits were made in late summer or early fall when lakes were most accessible and when water temperature and biological activity are at a maximum. (See also W74-06270) (Knapp-USGS)
W75-03968

LIMNOLOGICAL DATA FROM SELECTED LAKES IN THE SAN FRANCISCO BAY REGION, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
L. J. Britton, R. F. Ferreira, and R. C. Averett.
Open-file report, June 25, 1974. 79 p, 34 fig, 21 tab, 28 ref.

Descriptors: *Limnology, *Basic data collections, *Lakes, *California, Hydrologic data, Water quality, Thermal stratification, Reservoirs.
Identifiers: *San Francisco Bay area(Calif).

Limnological data were compiled on 21 lakes in the San Francisco Bay area of California. The history of each lake and of its regulating agency is presented, along with methods used for data collection and analyses. The largest reservoir, Lake Berryessa, has a volume of 1,600,000 acre-ft, with a discharge area of 576 sq mi. Pilarcitos Lake is one of the smallest reservoirs, with a volume of 3,100 acre-ft and a drainage area of 3.80 sq mi. Eleven of the 21 reservoirs are open to the public for recreation. The most intensive shoreline development and use is at Lake Berryessa and Lake Merced. All but three of the 21 reservoirs were thermally stratified during the summer. Eight of the reservoirs showed evidence of dissolved-oxygen depletion during the summer. Lafayette Reservoir and Loch Lomond are mechanically aerated in order to increase the dissolved-oxygen concentration and lower the surface-water temperature. The lake waters ranged from hard (320 mg/liter) in Calero Reservoir, to soft (27 mg/liter) in Upper Crystal Springs Reservoir. Drainage from abandoned mercury mines in Santa Clara County has resulted in mercury concentrations in Calero and Lexington Reservoir fish. (Knapp-USGS)
W75-03975

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR BALDWIN LAKE, SAN BERNARDINO COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
J. J. French, and M. W. Busby.
Water-Resources Investigations 26-74, November 1974. 18 p, 4 fig, 6 tab, 8 ref, append.

Descriptors: *Floods, *Lakes, *California, Water level fluctuations, Frequency analysis, Statistics.
Identifiers: *Baldwin Lake(Calif).

Flood hazards were studied by analysis of shoreline features that represent former high-water stages on Baldwin Lake, California. These features are found at 10 different altitudes that range from 6,700 to 6,713 feet. Stage frequencies were assigned to the stages, but the date of formation of the features could be determined only for the most recent shorelines. Stage-frequency analysis involving 39 years of observed annual maximum stage record of the lake and an additional 40 years of synthetic record of annual maximum stage, based on a precipitation-stage relation, resulted in an estimate of 6,710.7 feet for the the lake altitude corresponding to the 100-year flood. (Knapp-USGS)
W75-03981

LIMNOLOGICAL STUDY OF LAKE SHASTINA, SISKIYOU COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
A. E. Dong, K. W. Beatty, and R. C. Averett.
Water-Resources Investigations 19-74, November 1974. 52 p, 12 fig, 13 tab, 27 ref.

Descriptors: *Lakes, *Limnology, *California, *Eutrophication, Water quality, Water pollution sources, Nutrients, Oxygen demand, Thermal stratification, Algae, Nitrates, Phosphates.
Identifiers: *Lake Shastina(Calif).

Surface water constituted more than 90 percent of the approximately 50,000 acre-foot inflow to Lake Shastina, California, in the 1972 water year. Annual changes in the quantity of water in storage in the lake are related mainly to variations in annual inflow. The lake is thermally stratified from spring through autumn. Water near the surface was supersaturated with oxygen while an acute dissolved-oxygen deficiency existed at depth. Nitrogen and phosphorus in solution are partly stratified during thermal stratification. Algal types consisted mainly of green algae and diatoms. Blue-green algae were absent most of the year. Benthic organisms were primarily Oligochaete, Chironomidae, and Chaoborus, all of which are adapted to a low dissolved-oxygen environment. Nitrogen and phosphorus concentrations in the lake are sufficient to support large algal blooms. Recent development of shoreline properties may accelerate the eutrophication of the lake. (Knapp-USGS)
W75-03982

A SUMMARY AND COMPARISON OF NUTRIENTS AND RELATED WATER QUALITY IN LAKES ERIE, ONTARIO, HURON, AND SUPERIOR,
Burlington (Ontario). Canada Centre for Inland Waters.
For primary bibliographic entry see Field 5B.
W75-04027

SPRING AND FALL THERMAL BAR DEVELOPMENT IN LAKE SUPERIOR,
Michigan Technological Univ., Houghton. Dept. of Chemistry and Chemical Engineering.
For primary bibliographic entry see Field 5B.
W75-04038

ADDITIONAL STUDIES OF THE EFFECTS OF SALT MARSH IMPOUNDMENTS ON MOSQUITO POPULATIONS,
North Carolina State Univ., Raleigh. Dept. of Entomology.
For primary bibliographic entry see Field 5G.
W75-04048

BIOLOGICAL AVAILABILITY OF SEDIMENT PHOSPHORUS TO MACROPHYTES,
Wisconsin Univ., Madison. Water Chemistry Program; and Wisconsin Univ., Madison. Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W75-04053

THE MORPHOEDAPHIC INDEX, A FISH YIELD ESTIMATOR--REVIEW AND EVALUATION,
Ontario Ministry of Natural Resources, Thunder Bay. Fish and Wildlife Research Branch.
For primary bibliographic entry see Field 5C.
W75-04116

SETTING UP A SPECIAL COLLECTION ON WATER POLLUTION IN A UNIVERSITY LIBRARY,
Case Western Reserve Univ., Cleveland, Ohio. Sears Library.
For primary bibliographic entry see Field 5G.
W75-04118

ANALYTICAL MODEL FOR A HEATED SUBMERGED DISCHARGE INTO BREAK WATER WALL AREA,
Wisconsin Univ., Milwaukee. Dept. of Energetics.
R. A. Jaisinghani, V. L. Shah, and K. C. Tsao.
In: Water For The Human Environment, Vol. IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 15-31. 3 fig, 4 ref.

Descriptors: *Heated water, *Water circulation, *Flow, *Dispersion, *Analytical techniques, Momentum equation, Energy equation, Turbulence, Model studies, Recreation, *Discharge(Water).
Identifiers: *Heated submerged discharge, Conservation equations.

The effects of a submerged thermal discharge in a shielded area created by a breakwater wall in the shore line of a lake or coastal area were studied to determine if such a shielded area could be used as a recreational area with relatively warmer water, especially in the fall and spring months, thereby increasing the length of the swimming season. The thermal discharge could be from a power plant or another source. A surface discharge would require dilution pumps to disperse the thermal energy within the shielded area, an operation involving high initial and operational costs. However, submerged discharges have high mixing characteristics and require fewer, if any, dilution pumps. The analytical model developed considered a three-dimensional, rectangular, turbulent, submerged, heated discharge. The conservation equations of mass, momentum, and energy were transformed from the Cartesian coordinates to coordinates suitable for a vertically deflected jet by assuming velocity and temperature profiles. The final integrated equations were presented in non-dimensional terms. These equations have not been used to test the applicability and validity of the solutions to practical problems. (See also W75-04213) (Singh-ISWS)
W75-04214

TWO-DIMENSIONAL TRANSIENT HYDRO-THERMAL MATHEMATICAL MODEL,
Stone and Webster Engineering Corp., Boston, Mass. Environmental Engineering Div.
Y. J. Tsai, and Y. C. Chang.
In: Water For The Human Environment, Vol. IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 76-88. 4 fig, 3 ref.

Descriptors: *Powerplants, *Thermal pollution, *Analytical techniques, Hydrodynamics, *Estuaries, Heat transfer, Tides, Cooling, Diffusion, Water temperature, Coriolis force, Computers, Model studies, *Mathematical models, Finite element analysis, Conservation, Equations.

The heat conservation equation in two horizontal dimensions with the equations of motion and continuity in vertically integrated form was solved for the spatial transient temperature rises in a body of water due to thermal discharge of artificial origin. Flow patterns and water level variations induced by the plant intake and discharge, stream inflow and outflow, meteorological parameters, and tidal agitation can be obtained from the mathematical model. The multioperational method (alternate direction implicit) used in the solution for the finite difference equations of the governing partial differintial equations is unconditionally stable and appears economical. The model makes it possible to investigate environmental design considerations in conjunction with cooling system alternatives, plant operating modes, and hydrological and meteorological conditions, and to minimize the effects of thermal discharges to the environment. A case study was presented in which a multiport submerged diffuser was employed. The hydrothermal condition which prevailed in the study area was numerically simulated and the results were depicted in computer-plotted graphs. (See also W75-04213) (Singh-ISWS)
W75-04219

COOLING POND TEMPERATURE PREDICTION,
Towson State Coll., Baltimore, Md. Dept. of Computer Science.
For primary bibliographic entry see Field 5B.
W75-04222

THERMAL POLLUTION OF THE GREAT LAKES -- A NON-PROBLEM,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 5B.
W75-04231

DEVELOPMENT OF A COMPLETE MATHEMATICAL MODEL FOR DESCRIBING THE POINT BEACH NUCLEAR POWER PLANT THERMAL PLUME,
Limnetics, Inc., Milwaukee, Wis.
For primary bibliographic entry see Field 5B.
W75-04238

RELATIONSHIP BETWEEN LIMNOLOGICAL CONDITIONS OF RESERVOIRS AND WATERSHED FEATURES - A SURVEY,
Ministry of Public Works, Madrid (Spain). Section of Sedimentation and Natural Pollution.
J. R. de la Torre, J. L. O. Casas, J. A. Garcia, and R. P. Martinez.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 401-410. 1 fig, 2 tab.

Descriptors: *Surveys, *Limnology, *Reservoirs, *Watersheds(Basins), Lake morphometry, Chemical properties, Physical properties, Water quality, Vegetation, Geologic formations, Climatic data, Biological properties.
Identifiers: *Spain.

A survey was performed in 42 reservoirs and their watersheds, located in southern Spain, in order to determine qualitative relationships between limnological parameters and basin features. Comparison between reservoirs also included shoreline colonizer plants. As a result of the survey, a five-stage impoundment classification was outlined from the eutrophication or nutrient-enrichment standpoint. A further classification was advanced for the presumed water degradation rate, based upon current status, age of impoundment, turnover rate and morphometric parameters. Floristic composition of shoreline colonizer plants appears to be well correlated with hydrological regulation patterns through the magnitude of impounded water level fluctuation. Yet, no significant classification of shore plants proved feasible, regarding limnological or morphometric parameters. Morphometric parameters, watershed features, and limnological parameters were tabulated for each reservoir surveyed. (See also W75-04213) (Humphreys-ISWS)
W75-04244

THE ELEMENTS OF CARRYING CAPACITY IN THE RECREATION UTILIZATION OF RESERVOIRS,
Bureau of Reclamation, Denver, Colo. Lower Missouri Region.
For primary bibliographic entry see Field 6B.
W75-04249

NATURAL PHOSPHATE REMOVAL MECHANISMS IN SOUTH FLORIDA LAKES,
Miami Univ., Coral Gables, Fla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5G.
W75-04250

THE EUTROPHICATION AND POLLUTION OF LAKE PAIJANNE, CENTRAL FINLAND,
Hydrobiological Research Inst., Jyvaskyla (Finland).
For primary bibliographic entry see Field 5C.
W75-04264

SURFACE WATER DATA OF THE UPPER MICHIGAN REGION PROJECT SANGUINE, SITE STUDY.
EDAW, Inc., San Francisco, Calif.
For primary bibliographic entry see Field 2E.
W75-04277

SAGINAW BAY: AN EVALUATION OF EXISTING AND HISTORICAL CONDITIONS,
Michigan Univ., Ann Arbor. Great Lakes Resource Management Program.
For primary bibliographic entry see Field 5C.
W75-04278

PRELIMINARY STUDY OF PHYTOPLANKTON OF LAKE ST. LOUIS, A BROADENING OF THE ST. LAWRENCE RIVER NEAR MONTREAL, QUEBEC, (IN FRENCH),
Montreal Univ., (Quebec). Dept. of Biological Sciences.
For primary bibliographic entry see Field 5C.
W75-04335

2I. Water In Plants

STEADY FLOWS OF WATER AND SALT IN UNIFORM SOIL PROFILES WITH PLANT ROOTS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
P. A. C. Raats.
Soil Science Society of America, Proceedings. Vol. 38, No. 5, September-October, 1974. p 717-722, 8 fig, 20 ref.

Descriptors: Flow, *Infiltration, *Hydraulic conductivity, *Leaching, *Soil-water-plant relationships, Transpiration, Salts, Pressure head, Root zone, Saturated soils, Water table.

Upward and downward flows of water in the presence of uptake by plant roots is analyzed. Calculations are based upon an exponential increase of the hydraulic conductivity with the pressure head and an exponential decrease of the rate of uptake with depth. For downward flows, the distribution of the matric flux potential can be expressed as a function of the rate of infiltration, the leaching fraction, and two parameters describing the soil and the uptake distribution. For upward flows, the distribution of the matric flux potential can be expressed as a function of the rate of infiltration, the rate of transpiration, the hydraulic conductivity of the saturated soil, and the same two parameters describing the soil and the uptake distribution. An evaluation is also made of the distribution of salts associated with the steady downward flows. (Mastic-Arizona)
W75-03956

AGRONOMIC SURVEY OF JOJOBA IN CALIFORNIA,
California Univ., Riverside. Dept. of Plant Sciences.
For primary bibliographic entry see Field 3F.
W75-03960

NITROGEN FIXATION BY BLUE-GREEN ALGAE-LICHEN CRUSTS IN THE GREAT BASIN DESERT,
Utah State Univ., Logan. Dept. of Soil Biochemistry and Microbiology.
For primary bibliographic entry see Field 5B.
W75-03963

RELATIONSHIPS OF RING WIDTHS IN ARID-SITE CONIFERS TO VARIATIONS IN MONTHLY TEMPERATURE AND PRECIPITATION,
Arizona Univ., Tucson. Lab. of Tree-Ring Research.
H. C. Fritts.
Ecological Monographs, Vol. 44, No. 4, 1974. p 411-440, 4 tab, 13 fig, 30 ref.

Descriptors: *Trees, *Arid climates, *Regression analysis, *Dendrochronology, *Arid lands, Temperatures, Precipitation(Atmospheric), Ecosystems, Seasonal, Climates, Altitude, Plant growth, Microenvironment.
Identifiers: *Tree rings, Cluster analysis, Dendroclimatology.

The effects of temperature and precipitation on the diameter growth of arid-site conifers were evaluated using newly developed empirical techniques. One technique employs multiple regression on principal components of climate. The other technique is a cluster analysis which is used to identify similarities among the response functions and then classify them by similarities and differences. Precipitation was directly related to growth throughout the year for 32 percent of the sites, but on the remaining 68 percent the effects of precipitation varied from season to season. Temperature was most commonly inversely related to ring width during autumn, spring and summer for arid-site conifers, but in cases of high altitudes, high latitudes, or on north facing slopes, a direct relationship was often noted. The variety of ring-width responses to climatic variations suggested a need for more physiological studies of trees on arid or other extreme sites which may reveal unique growth-environment relationships that have not been observed on the more optimum sites. (Mastic-Arizona)
W75-03964

RELATION OF SOYBEAN LEAF WATER POTENTIAL TO SOIL WATER POTENTIAL,
Kansas Agricultural Experiment Station, Manhattan. Evapotranspiration Lab.
For primary bibliographic entry see Field 3F.
W75-03989

A FIELD STUDY OF THE HEAT AND DROUGHT TOLERANCE OF GRAIN SORGHUM (SORGHUM BICOLOR (L.) MOENCH) AS AN APPROACH TO GENETIC IMPROVEMENT,
Nebraska Univ., Lincoln. Dept. of Agronomy.
V. B. Ogunlela.

Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 238, $4.75 in paper copy, $2.25 in microfiche. M.S. Thesis, August 1974. 93 p, 23 tab, 66 ref, append. OWRT A-026-NEB(1).

Descriptors: *Water utilization, Crop production, *Drought tolerance, *Grain sorghum, Genetics, Plant breeding, Heat, Measurement, Leaves, Electrical conductance.
Identifiers: *Heat tolerance(Plants), Leaf tissue(Plants).

The purpose was to study the feasibility of selecting for heat and drought tolerance among sorghum genotypes under field conditions. A field study was conducted on 21 grain sorghum lines to screen them for heat and drought tolerance using a combination of laboratory techniques and field measurements. These lines had previously been classified into three groups of heat tolerance (high, medium and Low) based on a 1972 study. An electrical conductivity method using leaf discs was employed to test for heat and drought tolerance of leaf tissue during the growing season. Several agronomic characteristics were measured and related to heat and drought tolerance. These included flag leaf area, area of the four top leaves, grain yield per head, 1,000-seed weight, grain yield per hectare, plant height, 50% bloom date and number of heads. Results have shown that some closely related sorghum lines are consistently more heat or drought tolerant than others, and that techniques can be applied to separate these lines into distinguishable categories with regard to responses to these environmental stresses. A positive correlation often existed between heat and drought tolerance in these grain sorghums.
W75-04044

SOME CONSIDERATIONS ON PLANT TYPES FOR DRYLAND AGRICULTURE,
Central Arid Zone Research Institute, Jodhpur (India).
M. V. R. Prasad.
Annals of Arid Zone, Vol 12, No 3 and 4, September/December, 1973. p 125-134, 2 tab, 46 ref.

Descriptors: *Crop production, *Agriculture, *Arid lands, *Drought resistance, *Soil-water-plant relationships, Drought, Dry farming, Plant breeding.

An analysis of crop growth on unirrigated lands was made to determine the factors most important in selecting plant types for dry land agriculture. Crop varieties that are currently cultivated are those that have been selected for their ability to resist drought rather than productivity. Attributes that are essential for plant survival are not necessarily the same needed for productivity. In order to better insure against crop failure, it is necessary to develop plant types suitable for mixed cropping, taking competitive ability and complementary characteristics into consideration. Plant breeding is warranted for eliminating undesirable traits and combining drought resistance and productivity characteristics suitable for dryland agriculture. (Mastic-Arizona)
W75-04126

THE EFFECT OF INTERVAL AND INTENSITY OF DEFOLIATION ON THE DRY MATTER PRODUCTION OF SOME IMPORTANT GRASS SPECIES OF WESTERN RAJASTHAN,
Indian Grassland and Fodder Research Inst., Jhansi.
P. M. Dabadghao, R. Deb Roy, and S. P. Marwaha.
Annals of Arid Zone, Vol 12, No 1 and 2, March-June 1973. p 1-8, 1 tab, 13 ref.

Descriptors: *Grasses, *Plant growth, *Pasture management, *Production, Rainfall, Weather.
Identifiers: Lasiurus sindicus Henr., Panicum antidotale Retz., Cenchrus ciliarus Linn., Cenchrus setigerus Vahl.

The effect of three intervals and three intensities of defoliation on dry matter production of Lasiurus sindicus Henr., Panicum antidotale Retz., Cenchrus ciliarus Linn., and Cenchrus setigerus Vahl., were studied in Rajasthan. During a 30 day dry interval L. sindicus and C. setigerus produced greater yields, irrespective of variation in rainfall. Similar results were observed for C. ciliarus and P. antidotale only in drought years. Clipping at 15 cm. stubble height in L. sindicus gave maximum yields irrespective of the season. Interaction between interval and intensity of clipping was significant only in L. sindicus and P. antidotale. A safe degree of utilization appears to be 15 cm. in all species, particularly in L. sindicus and C. setigerus; however, C. ciliarus and P. antidotale can be used down to 10 cm. under proper management. (Mastic-Arizona)
W75-04131

EFFECT OF QUALITY OF IRRIGATION WATER ON DRY MATTER PRODUCTION, AND ON CALCIUM, MAGNESIUM AND PHOSPHORUS CONTENT OF WHEAT, BARLEY AND PEA,
Udaipur Univ. (India). Coll. of Agriculture.
M. U. Khan, and S. N. Saxena.
Annals of Arid Zone, Vol 13, No 1, March, 1974. p 11-16, 2 tab, 10 ref.

Descriptors: *Irrigation water, *Water quality, *Phosphorus, *Calcium, *Magnesium, *Plant growth, Wheat, Barley, Boron, Conductivity, Crops.
Identifiers: Pea, SAR(Sodium absorption ratio).

Conductivity, SAR (sodium absorption ratio) and boron content of applied irrigation water were evaluated for barley, wheat, and pea. In all 3 crops, increasing levels of the 3 variables caused a suppression in dry matter production. Interactions of SAR with boron resulted in a definite increase in calcium, magnesium and phosphorus content in pea, but in barley and what the phosphorus content increased and the calcium and magnesium contents decreased. Calcium absorption increased with an increase in conductivity in all three crops, but magnesium absorption increased in wheat and pea, and not in barley. Phosphorus content also increased in pea and wheat with increased conductivity. (Mastic-Arizona)
W75-04137

THE EFFECT OF VARIOUS RATES OF SEMICONTINUOUS DRIP IRRIGATION ON LETTUCE, (LACTUCA SATIVA L.) GROWN IN GREENHOUSE,
Oak Ridge National Lab., Tenn.
D. Shinshi, and J. W. Michel.
Available from the National Technical Information Service, Springfield, Va 22161 as ORNL-TM-4302, $4.00 in paper copy, $2.25 in microfiche. Nuclear Desalination Program, August, 1973. 36 p, 5 tab, 6 fig, 4 ref.

Descriptors: *Irrigation, *Irrigation effects, *Soil moisture, *Moisture stress, *Lettuce, *Soil-water-plant relationships, Moisture tension, Tensiometers, Plant growth, Evapotranspiration, Soil profile, Greenhouses, Regime.
Identifiers: *Drip irrigation.

The response of lettuce plants to semicontinuous drip irrigation treatments was studied under greenhouse conditions. Treatments corresponded to 100, 70, and 50 percent of the estimated potential evapotranspiration for three weeks, followed by one week where the 70 and 50 percent treatments were reduced to 50 and 35 percent respectively. Soil moisture tension was monitored throughout the soil profile by a grid of small tensiometers. During the first three weeks, the growth, dry matter accretion, and indices of plant water status in the three treatments were essentially equal. During the fourth week, the treatment that was restricted to 35 percent of potential evapotranspiration showed growth cessation and other signs of water-stress. It was suggested that a relatively high performance in plants may be maintained if water is supplied continuously even if the amount is markedly restricted. (Mastic-Arizona)
W75-04146

EVALUATION OF CRITERIA FOR SEPARATING SOILS WITH XERIC AND UDIC MOISTURE REGIMES,
Bureau of Land Management, Portland, Oreg.
For primary bibliographic entry see Field 2G.
W75-04312

2J. Erosion and Sedimentation

METHOD AND APPARATUS FOR BREAKING WAVES,
For primary bibliographic entry see Field 8B.
W75-03868

DEVICE FOR PRODUCING AND PROTECTING DEPOSITS OF SEDIMENTARY MATERIAL ON THE FLOOR OF BODIES OF WATER,
For primary bibliographic entry see Field 8B.
W75-03871

PROTECTING CREEKSHEDS: DEVELOPMENT AND EVALUATION OF A METHOD TO MANAGE SMALL, URBANIZING WATERSHEDS THROUGH LOCAL GOVERNMENT ACTIONS,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03947

PROTECTING CREEKSHEDS, ANALYSIS AND ACTION,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03948

DUNE SAND STABILIZATION WITH SYNTHETIC SOIL CONDITIONERS: A LABORATORY EXPERIMENT,
Ghent Rijksuniversiteit (Belgium). Soil Physics, Soil Conditioning and Horticultural Soil Sciences Lab.
For primary bibliographic entry see Field 2G.
W75-03953

CHARACTERISTICS AND PREDICTION OF SOIL EROSION ON A WATERSHED IN THE PALOUSE,
Idaho Univ., Moscow.
L. Druffel.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 251, $5.25 in paper copy, $2.25 in microfiche. M Sc Thesis, May 1973. 95 p, 8 fig, 4 tab, 5 append. OWRR A-029-IDA(5).

Descriptors: *Soil erosion, Regression analysis, *Erosion, *Idaho, Watersheds(Basins), *Data collections, *Forecasting.
Identifiers: *Palouse region(Ida).

The objective was to study the process of soil loss by water on a watershed and determine the effect of various hydrologic parameters. The 1971-72 wateryear provided good data and 3.71 tons/acre soil loss was measured on a storm basis. The annual figure is estimated to be 4 tons/acre which would include unmeasured events and low flow periods with minimal losses. The 1972-73 wateryear was a poor year from the standpoint of erosion data as it was quite dry. However, three of the events which occurred were of the frozen

ground type which provided valuable hydrologic data. Frozen ground events were deleted from the erosion data analysis. The soil loss events that were not on frozen ground were analyzed on a storm basis and a predictive equation for use on this watershed was developed by multiple regression techniques using several hydrologic parameters. Soil loss was found to depend mainly on amounts and timing of precipitation, volume of runoff, snow melt, and the conditions of the soil. The data collected yielded good results but left unanswered the question of the effect of cropping pattern, tillage practice, slope, slope length, and slope aspect on soil erosion. These parameters are all very important to amount of soil loss but did not vary in this case because the work was done on one watershed with one cropping practice.
W75-04033

A REVIEW OF DESERTIZATION IN AFRICA--WATER, VEGETATION, AND MAN,
Secretariat for International Ecology (Sweden).
A. Rapp.
Secretariat for International Ecology, SIES Report No. 1, 1974. 77 p, 25 fig, 4 tab, 81 ref.

Descriptors: *Africa, *Deserts, *Desert plants, *Arid climates, *Arid lands, *Reclamation, *Remote sensing, Wind erosion, Vegetation effects, Vegetation establishment, Surveys, Monitoring, Rainfall, Grazing, Dry farming, Degradation, Soils, Soil stability, Soil erosion.
Identifiers: *Desertization.

The causes of actual desertization in the African arid countries are discussed based on available literature, reports by and interviews with experts, and visits to field projects. Desertization is primarily man-caused as a result of overgrazing, overcultivation, wood cutting, and burning. This overexploitation destroys the plant cover required to protect the soil against rapid erosion by wind or water. To serve as a basis for checking the spread of desertization, it is recommended that surveys and monitoring of desertization should be systematically undertaken in selected transects. In addition, pilot trial plots should be used for the purpose of research and development of ecologically sound methods of desert land use. (Mastic-Arizona)
W75-04142

HYDRAULIC AND FLOW STUDIES RELATED TO SEDIMENT TRANSPORT, KENTUCKY RIVER, KENTUCKY,
Kentucky Water Resources Inst., Lexington.
B. R. Moore.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 259, $4.25 in paper copy, $2.25 in microfiche. Research Report No. 81, 1974. 58 p, 7 fig, 2 tab, 3 ref, 2 append. OWRT A-054-KY(1). 14-31-0001-4017.

Descriptors: *Sediment transport, *Scour, Dredging, Kentucky, Open channel flow, Hydraulics, *Sands, Waste disposal, *Path of pollutants, *Sediment distribution, Distribution patterns.
Identifiers: *Kentucky River(Kent), Ohio River(Kent).

This study related the conditions of flow and channel shape to distribution of sediment types in the Kentucky River. Seven distinct types of sediment association were delineated and these have a regular pattern of distribution influenced by the presence of navigation locks and dams. The most suitable locations for commercial extraction of bed material were clearly indicated and the variations of sand size delineated. The irregular discharge pattern of the stream indicates potential problems in the disposal of solid waste pollutants. A remeasurement of the dredge hole in the Ohio River indicated a continuation of the same vortex scour action and sand deposition analysed in earlier work. (See also W70-06132 and W73-08468) (Grieves-Kentucky)
W75-04147

POLLUTION POTENTIAL OF AQUATIC SEDIMENTS,
Missouri Univ., Rolla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5B.
W75-04150

DISPOSAL OF POLLUTED DREDGINGS FROM THE GREAT LAKES AREA,
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 5B.
W75-04251

2K. Chemical Processes

PHYSICAL PROPERTIES OF OXYGEN-17 WATER: ABSOLUTE VISCOSITY AND DENSITY OF H2(17)0 BETWEEN 15 AND 35C,
Weizmann Inst. of Science, Rehovot (Israel) Dept. of Isotope Research.
For primary bibliographic entry see Field 1A.
W75-03881

THE PROCESSING AND STORAGE OF WATER-QUALITY DATA IN THE NATIONAL WATER DATA STORAGE AND RETRIEVAL SYSTEM,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-03970

THE OBSERVATION-WELL NETWORK OF THE U.S. GEOLOGICAL SURVEY IN FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 7C.
W75-03971

QUALITY AND AVAILABILITY OF WATER IN WESTERNMOST TEXAS,
Geological Survey, El Paso, Tex.
J. S. Gates.
Open-file report, 1975. 8 p.

Descriptors: *Water quality, *Groundwater, *Surface waters, *Water resources, *Texas, Alluvium, Return flow, Sulfates, Chlorides, Water supply, Water yield.
Identifiers: *El Paso(Tex).

In westernmost Texas, the availability and quality of water are dominated by the natural dissolved-mineral content. The predominant dissolved minerals are sodium chloride and calcium sulfate. The quality of water in the Rio Grande varies with the amount of discharge and with location along the stream. During the spring and summer, the mineral content of water in the Rio Grande at El Paso is about 600 to 700 mg/liter. At this time, water is being released from reservoirs upstream, and the discharge consists mostly of surface runoff. During the fall and winter when no water is released from the reservoirs, the discharge is derived mostly from groundwater seepage into the river, and the dissolved-solids concentration at El Paso, which is dominantly sodium sulfate, normally ranges from 1,000 to 2,000 mg/liter or more. Much of this groundwater seepage represents return flow of irrigation water applied to the Mesilla Valley. This return flow contains minerals leached from the soil, and it is concentrated because part of the water originally applied to the land was lost by evaporation and transpiration. At the lower end of the Hueco Bolson at Fort Quitman, the mineral content of water in the Rio Grande ranges from 1,000 to 3,000 mg/liter or more at all times of the year, and reached 10,700 mg/liter in June 1953. Most of the water for municipal and domestic supply in westernmost Texas is groundwater. The total amount of water pumped from deep wells in the El Paso area in 1972 for municipal and military supply, industrial use, and irrigation was about 115,000 acre-feet, Most of this water contained less than 500 mg/liter dissolved solids. (Knapp-USGS)
W75-03979

SPECIAL TECHNIQUES FOR DETERMINING CHEMICAL PROPERTIES OF GEOTHERMAL WATER,
Geological Survey, Menlo Park, Calif.
T. S. Presser, and I. Barnes.
Available from NTIS, Springfield, Va. 22161 as PB-235 148, $3.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 22-74, August 1974. 11 p, 1 tab, 3 ref.

Descriptors: *Water analysis, *Geothermal studies, *Chemical analysis, *Analytical techniques, Sampling, Methodology, On-site investigations, Thermal water, Laboratory tests, Aqueous solutions, Water chemistry, Trace elements, Heavy metals, Hydrogen ion concentration, Filtration.
Identifiers: *Water sample preservation, Field preparation, Water sample stability.

A reliable determination of the chemical composition of geothermal fluids may require special sampling and preservation techniques. A sample collected without pretreatment is usually adequate for the analysis of sodium, potassium, and chloride. Other constituents may require further treatment of even analysis in the field, depending on the data requirements. The collection and preservation methods described permit accurate results for 31 chemical variables, including major and minor chemical constituents. (Woodard-USGS)
W75-03980

PRECONSTRUCTION ASSESSMENT OF BIOLOGICAL QUALITY OF THE CHENA AND LITTLE CHENA RIVERS IN THE VICINITY OF CHENA LAKES FLOOD CONTROL PROJECT NEAR FAIRBANKS, ALASKA,
Geological Survey, Anchorage, Alaska.
For primary bibliographic entry see Field 5B.
W75-03988

DETERMINATION OF PARTS PER BILLION SULFIDE IN WATER WITH THE SULFIDE-SELECTIVE ELECTRODE,
Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.
For primary bibliographic entry see Field 5A.
W75-04021

IRREVERSIBLE THERMODYNAMIC CONCEPT ON HYDROGEOCHEMICAL TRANSPORT SYSTEMS,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 5B.
W75-04041

BENTHOS AND ALLOCHTHONOUS ORGANIC MATTER IN STREAMS,
Waterloo Univ. (Ontario). Dept. of Biology.
For primary bibliographic entry see Field 5B.
W75-04119

COMPARISON OF SOME METHODS FOR DETERMINING ORGANIC PHOSPHORUS IN SOME NIGERIAN SOILS,
Institute for Agricultural Research, Zaria (Nigeria).
For primary bibliographic entry see Field 2G.
W75-04139

EVALUATION OF EDDHA AS AN EXTRACTION AND ANALYTICAL REAGENT FOR ASSESSING THE IRON STATUS OF SOILS,
Nevada Agricultural Experiment Station, Reno.
For primary bibliographic entry see Field 2G.
W75-04144

WATER QUALITY ASPECTS OF THE 1973 OPENING OF THE MISSISSIPPI RIVER DIVERSION SPILLWAY AT BONNET CARRE, LOUISIANA, U.S.A.,
Army Engineer District, New Orleans, La.
For primary bibliographic entry see Field 5B.
W75-04256

EXPERIMENTAL METHODS FOR OBTAINING PERCOL MODEL INPUT AND VERIFICATION DATA,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
For primary bibliographic entry see Field 5B.
W75-04276

LYSIMETRIC AND CHEMICAL INVESTIGATIONS OF PEDOLOGICAL CHANGES: I. LYSIMETERS AND THEIR DRAINAGE WATERS,
Missouri Univ., Columbia.
For primary bibliographic entry see Field 2G.
W75-04311

SULFATE REDUCTION AND SULFIDE OXIDATION IN FLOODED SOIL AS AFFECTED BY CHEMICAL OXIDANTS,
Army Engineer Waterways Experiment Station, Vicksburg, Miss. Office of Dredged Material Research.
For primary bibliographic entry see Field 5B.
W75-04347

2L. Estuaries

METHOD AND APPARATUS FOR BREAKING WAVES,
For primary bibliographic entry see Field 8B.
W75-03868

DEVICE FOR PRODUCING AND PROTECTING DEPOSITS OF SEDIMENTARY MATERIAL ON THE FLOOR OF BODIES OF WATER,
For primary bibliographic entry see Field 8B.
W75-03871

PNEUMATIC BARRIERS TO REDUCE SALT INTRUSION THROUGH LOCKS,
Waterloopkundig Laboratorium, Delft (Netherlands). Density Currents Branch.
For primary bibliographic entry see Field 8A.
W75-03920

EXPERIENCES WITH TIDAL SALINITY MODEL EUROPOORT,
Delta Works, The Hague (Netherlands). Hydraulics Div.; and Waterloopkundig Laboratorium, Delft (Netherlands).
For primary bibliographic entry see Field 8B.
W75-03927

THE THERMAL REQUIREMENTS AND TOLERANCES OF KEY ESTUARINE ORGANISMS,
Maryland Univ., Prince Frederick. Center for Environmental and Estuarine Research.
For primary bibliographic entry see Field 5C.
W75-03944

THE COMPARATIVE MARINE GEOCHEMISTRIES OF LEAD 210 AND RADIUM 226,
Scripps Institution of Oceanography, La Jolla, Calif.
For primary bibliographic entry see Field 5B.
W75-04029

ENHANCEMENT OF RECREATIONAL USES OF ESTUARINE WATERS THROUGH STUDY OF POTENTIAL CONTROL METHODS FOR STINGING SEA NETTLES,
Maryland Univ., Solomons. Natural Resources Inst.
For primary bibliographic entry see Field 5C.
W75-04037

ANALYTICAL MODEL FOR A HEATED SUBMERGED DISCHARGE INTO BREAK WATER WALL AREA,
Wisconsin Univ., Milwaukee. Dept. of Energetics.
For primary bibliographic entry see Field 2H.
W75-04214

TWO-DIMENSIONAL TRANSIENT HYDROTHERMAL MATHEMATICAL MODEL,
Stone and Webster Engineering Corp., Boston, Mass. Environmental Engineering Div.
For primary bibliographic entry see Field 2H.
W75-04219

DATA COLLECTION AND ANALYSIS TECHNIQUES FOR GLOBAL MARINE POLLUTION STUDIES,
Department of the Environment, Ottawa, (Ontario). Marine Sciences Directorate.
For primary bibliographic entry see Field 5A.
W75-04236

MECHANICS OF DISPERSION OF POLLUTANTS IN COASTAL ENVIRONMENT,
Department of Water Affairs, Orania (South Africa).
For primary bibliographic entry see Field 5B.
W75-04237

RUN-OFF REGULATION OF THE ST. LAWRENCE AND ITS LIABILITY,
Bedford Inst., Dartmouth (Nova Scotia).
For primary bibliographic entry see Field 4A.
W75-04243

COMPUTATION OF TIDES, CURRENTS, AND DISPERSAL OF POLLUTANTS IN THE NEW YORK BIGHT FROM BLOCK ISLAND TO ATLANTIC CITY WITH LARGE GRID SIZE, SINGLE AND TWO-LAYER HYDRODYNAMICAL-NUMERICAL MODELS, PART 4,
Environmental Prediction Research Facility (Navy), Monterey, Calif.
For primary bibliographic entry see Field 5B.
W75-04262

MARINE STUDIES OF SAN PEDRO BAY, CALIFORNIA, PART V; DATA REPORT, TEMPERATURE, SALINITY, OXYGEN AND HYDROGEN ION CONCENTRATION IN OUTER LOS ANGELES HARBOR, JUNE 1971 TO NOVEMBER 1973.
Southern California, University of Los Angeles. Sea Grant Program.
For primary bibliographic entry see Field 5B.
W75-04272

AQUATIC SURVEY OF THE KONA COAST PONDS, HAWAII ISLAND,
Hawaii Univ., Honolulu. Sea Grant Program.
R. E. Brock.
Available from the National Technical Information Service, Springfield, Va. 22161, as COM 74-11037, $4.75 paper copy, $2.25 microfiche. Report No. UNIHI-SEAGRANT-AR-74-04, April 1974. 73 p, 10 ref, 6 append. NOAA Grant 04-3-158-29.

Descriptors: *Aquatic habitats, *Intertidal areas, *Hawaii, *Biological communities, *Aquatic environment, Fish, *Ponds, Surface waters, Aquatic weeds, Aquatic plants, Balance of nature, Habitats, Marine biology, Ecology, Salinity, Temperature, Dissolved oxygen, Geology.
Identifiers: Kona Coast, Anchialine ponds, Coastal ponds.

During a 17-month period beginning July 1972, 318 shoreline ponds were located and surveyed in the five land districts of Hawaii Island's leeward coast. The survey concerned an inventory of environmental and biological characteristics for the purpose of assessing their scientific and natural resource values. This inventory included all coastal waters--from excavated wells and small fissures to large Hawaiian fishponds--that are not part of the marine ecosystem. Relevant information on geology and terrestrial vegetation was presented. Collectively, the ponds have distinctive environmental features. Characteristic aquatic vegetation consists of the vascular aquatic pondweed, Ruppia maritima, and two types of encrusting algal communities. Pond animal communities were divided into two main groups depending upon their connections to the sea. The 13 ponds with surface connections to the sea have diverse species that are mainly of marine origin. The remaining 305 ponds with only subterranean water connections contain fewer but more distinctive animals. In these 'closed' ponds, crustaceans and mollusks are the most abundant and characteristic animals among the 55 taxons recognized. Detailed maps and biota catalogs were provided. (Henley-ISWS)
W75-04275

A DRIFT CARD STUDY IN MONTEREY BAY, CALIFORNIA: SEPTEMBER 1971 TO APRIL 1973,
California State Univ., San Jose. Dept. of Natural Science.
D. D. Blaskovich.
Available from the National Technical Information Service, Springfield, Va. 22161, as COM-74-11266, $4.75 paper copy, $2.25 microfiche. Technical Publication 73-4, 1973. 79 p, 17 fig, 4 tab, 35 ref, 1 append. SGP2-94.

Descriptors: *Oceanography, *Ocean circulation, *Ocean currents, Tides, Pacific Ocean, Bays, *California, Winds, *Drifting(Aquatic), Movement, On-site data collections, Seasonal.
Identifiers: *Monterey Bay(Calif) Drift cards.

Drift cards were released in Monterey Bay, California, to detect seasonal variations in the California Current system, and seasonal and diurnal wind variations in the immediate vicinity of the bay. About 23% of the cards were recovered, although the recovery rate varied from about 5% in the winter to about 60% in the late summer. Drift card speeds ranged from 1 to 8 km/day, in the winter and summer months respectively. Good agreement was observed between geostrophic currnt, wind, drogue, and drift card data, although drift cards were observed to be primarily wind driven. A weekend bias in drift card recoveries was observed for the entire period of study; however, it was less pronounced for those cards released during the summer months. Two bogus releases were used to estimate the discovery lag time, reported position accuracy, and longshore drift currents. Diurnal winds were observed during a 24-hour study which indicated that daily variations in the wind field may be as important as seasonal changes in moving surface water. The drift card speed was observed to be about 3% of the wind velocity, and 1 m/sec was estimated as the minimum effective wind. The wind factor, ranging from 2.2% to 4.0%, was used to estimate the actual paths of drift cards and to examine the role of diurnal winds in affecting surface water movement. (Gibb-ISWS)
W75-04279

BIOLOGICAL PROCESSES INVOLVED IN POLLUTION OF COASTAL AQUACULTURE WATERS,
Central Inland Fisheries Research Inst., Barrackpore (India).
For primary bibliographic entry see Field 5C.
W75-04281

THE DELAWARE ESTUARY SYSTEM, ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC EFFECTS. ANNEX TO VOLUME I. MANAGEMENT AGENCY PROBLEMS IN THE DELAWARE ESTUARY,
Delaware Univ., Newark; and Academy of Natural Sciences of Philadelphia, Pa.
For primary bibliographic entry see Field 6F.
W75-04328

THE SHAPE OF THE INTERFACE IN STEADY FLOW IN A STRATIFIED AQUIFER,
Technion - Israel Inst. of Tech., Haifa (Israel). Dept. of Civil Engineering.
For primary bibliographic entry see Field 2F.
W75-04329

3. WATER SUPPLY AUGMENTATION AND CONSERVATION

3A. Saline Water Conversion

MILTI-STAGE FLASH EVAPORATOR,
Aqua-Chem, Inc., Milwaukee, Wis. (assignee)
P. J. P. Liu.
US Patent No 3,855,072, 5 p, 5 fig, 14 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 1188, December 17, 1974.

Descriptors: *Patents, *Evaporators, *Condensation, *Heat exchangers, *Desalination, *Distillation, Sea water, Water treatment, Vapor compression distillation, Equipment, *Flash distillation.
Identifiers: *Flash evaporation, Multi-stage flash evaporators.

A flash evaporator has at least one flash chamber divided into an evaporating space and a condensing space. Heat exchange tube bundles are disposed in the condensing space and extend in a direction generally transverse to the direction of feed water flow through the chamber. The heat exchange tube is arranged such that a first margin is exposed to the vapors flashed in the chamber and a vent is located in a second unexposed margin. The straight line of distance from any point on the exposed margin is equal and the number of tubes to which the vapors are exposed constantly decreases as the vapors traverse the tube bundle from the exposed margin to the vent. (Sinha-OEIS)
W75-03860

METHOD AND APPARATUS FOR USE IN WATER PURIFICATION BY REVERSE OSMOSIS,
Ultrascience, Inc., Skokie IH. (assignee).
For primary bibliographic entry see Field 5D.
W75-03874

APPARATUS FOR SOLAR DISTILLATION,
H. R. Hay.
U. S. Paten No 3,846,251, 6 p, 9 fig, 12 ref; Official Gazette of the United States Patent Office, Vol 928, No 1, p 250, November 5, 1974.

Descriptors: *Patents, *Distillation, *Solar stills, *Solar distillation, *Waste water treatment, Separation techniques, Equipment.

The app the distilland basin and the substances with it. The substances may be liquids or solids, absorbent or non-absorbent, for aiding in the process of recovery of water from the atmosphere. The movement of natural or forced air over the distilland basin at night results in the deposition of water subsequently recovered by solar distillation during the daytime. The cover is radiation-transmitting, - it is transparent or translucent to solar rays and is capable of transmitting energy to convert distilland to vapors condensed on the cover. One or more distilland-retaining components is exposed to the night sky for purposes of lowering their temperatures below that which would be obtained if the cover remained. By forcing the air through the still during the nighttime when the outside air has a higher moisture content than air within the still allows the deposition of dew to occur in convenient areas for recovery. (Sinha-OEIS)
W75-03876

HOT BALL DESALINATION PROCESS,
Occidental Petroleum Corp., Los Angeles, Calif. (assignee).
J. R. Phillips.
U. S. Patent No 3,843,462, 8 p, 9 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 927, No 4, p 1622, October 22, 1974.

Descriptors: *Patents, *Desalination, *Distillation, *Condensation, *Flash distillation, *Waste water treatment, Sea water, Brackish water, Fresh water, Potable water, Equipment.

A daeslination system utilizes the following steps: pressurizing the saline water to insure that it will remain liquid during heating; heating a stream of the pressurized relatively cool saline water to at least the flash distillation temperature of the initial flash distillation stage by counter-currently flowing a moving stream of heated pellets through the stream of saline water, the saline water being pressurized throughout the zone of contact with the pellets and remaining liquid; separating the exiting, thus relatively cooled pellets from the stream of heated saline water; and transferring the stream of heated saline water free of pellets to the initial flash distillation stage. Then the pressure and temperature are reduced to condense the water vapor produced by the distillation on the surfaces of the separated relatively cooled pellets. The condensate may then be removed for collection and the pellets returned for reuse. (Sinha-OEIS)
W75-03878

REGIONAL WATER SUPPLY DEVELOPMENT UTILIZING BRACKISH WATER RESOURCES IN THE SOUTHERN ARAVA REGION,
Mekorot Water Co. (Israel).
P. Glueckstern, Y. Kantor, and A. Ardman.
Presented at the International Symposium on Brackish water s a Factor in Development, held at the Ben-Gurion University of the Negev, Beer-Sheva, Israel, January 5-10, 1975. 21 p 5 tab, 6 fig, 3 ref.

Descriptors: *Brackish water, *Sea water, *Desalination, *Semiarid climates, *Water quality, Evaluation, Water supply development, Reverse osmosis, Potable water, Drinking water, Arid climates.
Identifiers: *Israel (Arava Valley).

Economic evaluations of alternative development programs were made for a semiarid region presently dependent on brackish and desalinated sea water for its water supply. Results showed that at prevailing energy prices the total coast of desalting brackish water is considerably lower than the energy cost only of desalting sea water. An economic incentive now exists to supply blended water of the lowest acceptable quality. Because of the current energy prices and differences in cost between desalted sea water and brackish water, the alternative of using all of the still undeveloped brackish water resources is by far the most economic. (Mastic-Arizona)
W75-03962

PUTTING THE SUN TO WORK: A HISTORY AND DIRECTORY OF CURRENTLY AVAILABLE SOLAR ENERGY APPLICATIONS,
Arizona State Fuel and Energy Office, Phoenix. Conservation Section.
K. Bacher.
State of Arizona, Office of the Governor, Arizona State Fuel and Energy Office, 1974. 27 p, 3 fig, 19 ref.

Descriptors: *Solar radiation, *Solar stills, *Heated water, *Thermal radiation, *Desalination, Desalination apparatus.
Identifiers: *Solar energy systems, *Solar cells, *Solar water heaters, *Solar thermal energy.

The purpose of this brochure is to inform the public of the equipment and uses of solar energy currently available. Brief discussions are presented of heliothermal, helioelectric, and heliochemical collection methods. Current systems employing solar energy are also discussed, and include water heaters which can be used in various systems to provide increased hot water to the residence, or to heat and cool houses. Other uses include solar stills for converting small amounts of brackish or sea water to fresh water, solar ovens and broilers, and swimming pool heaters. In addition to new and experimental systems being developed, equipment is available to 'retro-fit' existing facilities. A list of firms supplying solar equipment and references to solar energy books and articles is contained in the brochure. (Mastic-Arizona)
W75-04128

3B. Water Yield Improvement

AGRONOMIC SURVEY OF JOJOBA IN CALIFORNIA,
California Univ., Riverside. Dept. of Plant Sciences.
For primary bibliographic entry see Field 3F.
W75-03960

VEGETATION MANAGEMENT FOR INCREASED WATER YIELD IN ARIZONA,
Arizona Univ., Tucson. Dept. of Watershed Management.
P. F. Ffolliott, and D. B. Thorud.
Technical Bulletin 215, Agricultural Experiment Station, University of Arizona, Tucson, September 1974. 38 p 19 fig.

Descriptors: *Watershed management, *Water yield improvement, *Riparian plants, *Forestry, *Arizona, Ponderosa pine trees, Chapparal, Coniferous forests, Desert plants, Grasslands, Pinyon pine trees, Juniper trees, Alpine, Vegetation, Precipitation (atmospheric), Isohyets, Forest management.

A brief summary is presented of an analysis designed to define the potential for increasing water yields from watersheds in Arizona. Nine vegetation zones were recognized and characteristics and water yield improvement opportunities of each are given. The zones include the alpine, mixed conifer forests, aspen forests, ponderosa pine forests, pinyon-juniper woodlands, chapparal, grassland, desert shrub, and riparian association zones. A general methodology was used to obtain estimates of yield potentials by dividing Arizona into 15 drainage areas on which the vegetation zones were mapped. Total acreage for each area and zone was obtained from land ownership patterns. Finally, precipitation isohyets were superimposed to enable estimates to be made of potential amounts of water available in each area. This study suggests that the potential for

water yield improvement is significant particularly in the mixed conifer and ponderosa pine forests, and the chapparal zones. The range in potential water yield was calculated to be approximately 600,000 to 1,200,000 acre-feet per year. (Mastic-Arizona)
W75-03961

HYDROLOGIC DATA FOR 1973, BROWARD COUNTY, FLORIDA,
Geological Survey, Tallahassee, Fla.
H. W. Bearden.
Open-file report, 1974. 64 p, 42 fig, 5 tab, 18 ref.

Descriptors: *Hydrologic data, *Surface waters, *Groundwater, *Water quality, *Florida, Data collections, Rainfall, Runoff, Groundwater movement, Canals, Water management(Applied), Water analysis, Water yield improvement.
Identifiers: *Broward County(Fla).

This report, the third of an annual series, includes hydrologic data for Broward County, Florida for the 1973 water year. These data are compared with long-term records from rainfall, groundwater, surface-water, and water-quality stations. The average water-year rainfall, on the basis of 30 years of record (1943-1972), is 58.60 inches. Rainfall averaged 49.08 inches during the 1973 water year. Groundwater levels in the county during the 1973 low-water period were almost as low as during the 1971 record low-water period, although January-April rainfall was 7.58 inches in 1973 and 1.94 inches in 1971. Discharge throughout the surface flow system in Broward County was dependent on the intensity and duration of rainfall until the establishment of the water-management system in the county. Major modifications to the regional canal system began about 1953 and were virtually complete by 1962. The extreme flows have been greatly modified and the duration of moderate or optimum flows greatly lengthened. The chief threat to surface-water quality in urban areas is manmade contamination. Total coliforms exceeded the permissible limits for Class III waters (Recreation-propagation and management for fish and wildlife) and water for public supply in Broward canals except at site 43 in Snake Creek Canal during the 1973 water year. (Woodard-USGS)
W75-03976

THE DEVELOPMENT OF SUPPLEMENTAL WATER: RESOURCE FLEXIBILITY AND FARM MANAGEMENT OPTIONS,
Utah State Univ., Logan. Dept. of Economics.
For primary bibliographic entry see Field 3F.
W75-04031

WATER RESOURCES EVALUATION OF THE SOUTHERN HIGH PLAINS OF NEW MEXICO,
New Mexico State Univ., University Park. Dept. of Agricultural Economics.
For primary bibliographic entry see Field 4B.
W75-04042

GENERAL DISPOSITION AND AQUATIC ENVIRONMENTAL EFFECTS OF SILVER IODIDE IN PRECIPITATION MANAGEMENT,
Colorado State Univ., Fort Collins. Dept. of Earth Resources.
H. L. Teller, D. A. Klein, and D. R. Cameron.
In: Water For The Human Environment, Vol. IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 537-547. 1 fig, 7 tab, 7 ref.

Descriptors: *Weather modification, *Snow management, *Silver iodide, *Nucleation, *Hail, Cloud seeding, Water supply, Precipitation(Atmospheric), Storms, Winds, Air circulation, Meteorology, Aquatic environment, Mud, Ecosystems, Anaerobic bacteria, Microbial degradation, Cellulose, Grasslands, Vegetation, *Colorado.
Identifiers: *San Juan Mountains(Colo), Ground-based generator, Pyrotechnic devices, Hail suppression.

Studies of silver disposition on a winter-orographic and a summer-convective precipitation management project showed that additions of silver from cloud seeding are unlikely to be detectable by available methods. Apparent seasonal variation, but no increase in silver levels, was observed on both target areas. Silver accumulation in litter and soil, and uptake by plants, did occur at a ground-generator site. The addition of silver at 1 and 10 ppm to an aquatic mud environment resulted in an apparent decrease in cellulose decomposition in a laboratory test. Similar additions of silver compounds to the cellulose substrate itself appeared to enhance decomposition rates. Silver additions to aquatic mud environments may have discernible effects on microbial degradation processes. Silver and nitrogen appear to have opposing effects on these microbial activities, and the iodide, of itself, may cause changes in degradation rates. The observation of possible increased degradation when silver is directly in contact with substrates indicated that additional, more subtle, effects on decomposer processes may be occurring. (See also W75-04213) (Visocky-ISWS)
W75-04255

PROJECT SKYWATER.
Nevada Univ., Reno. Desert Research Inst.
Available from the National Technical Information Service, Springfield, Va 221611 as PB-231 460, $6.25 in paper copy, $2.25 in microfiche. Supplementary Final Report, July 1, 1972-September 30, 1973. 155 p, 135 fig, 7 tab. Contract No. 14-06-D-6632-1968.

Descriptors: *Weather modification, *Storms, Cloud seeding, Climatology, Cloud physics, Instrumentation, Radar, Data collections, *Nevada, *California, *Meteorology.
Identifiers: Storm patterns, *Sierra Nevada Mountains.

As the primary source of water for much of Nevada and California, the winter storms that bring moist Pacific air over the central Sierra Nevada mountain range were studied intensively over the past few years. The data acquisition systems and reduction procedures used were described, with particular emphasis on the systems aboard the instrumented B-26 aircraft. With a goal of determining the structure and organization of the winter storms, the data from six specific storms were presented in detail. While there is much variability between the different storms, there is nevertheless a tendency for the higher liquid water contents to occur at low levels along the western edge and over the main crest in all the storms studied. (Jones-ISWS)
W75-04265

OPEN CHANNEL FLOW EVAPORATION STUDY,
Bonneville Power Administration, Portland, Oreg.
For primary bibliographic entry see Field 2D.
W75-04273

EFFECT OF STORED SOIL MOISTURE RESERVE THROUGH CONSERVATION PRACTICES AND SUPPLEMENTAL IRRIGATION ON WHEAT YIELD UNDER DRYLAND FARMING CONDITION,
Indian Agricultural Research Inst., New Delhi (India).
For primary bibliographic entry see Field 3F.
W75-04346

3C. Use Of Water Of Impaired Quality

THE INFLUENCE OF SOIL SALINITY UPON FRUITING AND SHEDDING, BOLL CHARACTERISTICS, FIBER QUALITY, AND YIELDS OF TWO COTTON SPECIES,
Texas A and M Univ., El Paso. Agricultural Research Station.
D. E. Longenecker.
Soil Science, Vol 115, No 4, April, 1973. p 294-302, 6 tab, 1 fig, 13 ref.

Descriptors: *Cotton, *Soil water, *Salinity, Salts, *Irrigation, *Irrigation water, Saline water, Moisture stress, Moisture deficit, Plant growth, Crop production, Root zone, Salt tolerance.

The effects of substrate salinity were visible in both cotton species by reduction in plant growth and yields which were more evident at the highest salinity level of 8000 ppm salt in the water. Both Acala and Pima cotton species were affected in a similar manner which appeared to be primarily a stunting of growth. Also evident was a reduction in stem diameter, total number of fruiting forms initiated, total number of squares shed, total number of bolls matured, weights of both seed and lint per boll, and fiber length. The possibility exists of substituting moderate salinity for some degree of induced moisture stress which is believed to be desirable in late summer in order to slow vegetative growth and enhance fruiting. Application of saline water may be more desirable since plant moisture stress could be induced without the danger of acute moisture deficiencies caused by too long a delay of irrigation waters. (Mastic-Arizona)
W75-04134

A DEMONSTRATION OF WASTE HEAT USE IN AGRICULTURE,
National Environmental Research Center, Corvallis, Oreg.
For primary bibliographic entry see Field 5D.
W75-04224

3D. Conservation In Domestic and Municipal Use

MANAGEMENT OF WATER RESOURCES FOR URBAN ENVIRONMENTAL ENHANCEMENT,
Environments for Tomorrow, Inc., McLean, Va.
For primary bibliographic entry see Field 6B.
W75-04151

3E. Conservation In Industry

USE AND DISPOSAL OF SOLID WASTES FROM PULP AND PAPER PRODUCTION (VYUZITIE A LIKVIDACIA PEVNYCH ODPADOV Z VYROBY BUNICINY A PAPIERA),
Vyskumny Ustav Papier a Celulozy, Bratislava (Czechoslovakia).
For primary bibliographic entry see Field 5D.
W75-03886

AN EXAMPLE OF TREATMENT OF EFFLUENTS FROM PAPERMAKING WITH A VIEW TOWARD RECYCLING (UN EXEMPLE DE TRAITEMENT DES EFFLUENTS DE PAPETERIE EN VUE DU RECYCLAGE),
For primary bibliographic entry see Field 5D.
W75-03887

USE OF WASTE CHEMICALS IN KRAFT MILL EFFLUENT TREATMENT,
Finnish Pulp and Paper Research Inst., Helsinki.
For primary bibliographic entry see Field 5D.
W75-03891

POSSIBILITIES FOR PURIFYING RECYCLED OR WASTE WATERS FROM PAPER MILLS, TAKING PHYSICAL-CHEMICAL PROCESSES INTO ACCOUNT (LES POSSIBILITES D'EPURATION DES EAUX RECYCLEES OU RESIDUAIRES DES PAPETERIES, COMPTE-TENU DES PROCEDES CHIMICO-PHYSIQUES),
For primary bibliographic entry see Field 5D.
W75-03893

MILL ACHIEVES MAXIMUM REUSE OF WATER WITH REVERSE OSMOSIS,
For primary bibliographic entry see Field 5D.
W75-03899

NEW SCREENING CONCEPT BOOSTS WATER REUSE AT BOXBOARD MILL,
Sweco, Inc., Los Angeles, Calif. Environmental Systems Div.
For primary bibliographic entry see Field 5D.
W75-03900

AN ALARMING SYSTEM FOR HIGH-SOLIDS WHITE WATER,
For primary bibliographic entry see Field 5G.
W75-03901

KNOWLTON (BROTHERS INC., WATERTOWN, NEW YORK) MILL CLOSES LOOP ON WASTE TREATMENT/WATER REUSE,
Malcolm Pirnie, Inc., White Plains, N.Y.
For primary bibliographic entry see Field 5D.
W75-03904

HOW TO REDUCE BOD LEVELS FROM SIZE-PRESS STARCHES,
National Starch and Chemical Corp., New York.
For primary bibliographic entry see Field 5G.
W75-03906

CORRUGATED INK AND STARCH WASTES MEET EPA STANDARDS AT ST. REGIS.
For primary bibliographic entry see Field 5D.
W75-03907

SPILL PREVENTION AND CONTROL ASPECTS OF PAPER INDUSTRY WASTE WATER MANAGEMENT PROGRAMS,
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
For primary bibliographic entry see Field 5G.
W75-03912

CHANGING WATER USE IN SELECTED MANUFACTURING INDUSTRIES,
National Bureau of Economic Research, Washington, D.C.
For primary bibliographic entry see Field 6B.
W75-03922

WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN THE NORTHERN GREAT PLAINS COAL REGION OF EASTERN MONTANA, 1974-75.
Geological Survey, Helena, Mont.
For primary bibliographic entry see Field 7C.
W75-03977

THE STORY OF WONDER, CHURCHILL COUNTY, NEVADA,
Geological Survey, Carson City, Nev.
H. A. Shamberger.
Available from Nevada Historical Press, Star Route 1, Box 751, Carson City, Nev. 89701, $5.00. Nevada Historical Press, Carson City, Nevada, 1974. 80 p.

Descriptors: *Mining, *Water supply, *Nevada, *History, Water rights, Municipal water, Industrial water.
Identifiers: *Wonder(Nev).

The Wonder Mining District, Nevada, was one of 12 substantial mining districts that blossomed and boomed during the first decade of this century. While it was not so flamboyant as some of the other mining camps which flourished during this period, it was one of the most stable, as well as one of the most productive. Only a very few of the old mining camps in Nevada were situated near an adequate water supply for either the mining camp or town or for its mills. When a mining camp began developing, and where such development indicated that the camp would be a producer, one of the first problems encountered was where to obtain a water supply. The town of Wonder was somewhat of an anomaly with respect to its water supply, as compared to other mining camps. Within two months after the Wonder townsite was recorded in 1906, it was announced that Bench Creek water rights were purchased and piped to the town. On December 23, 1907, the company's mining operation filed application No. 760 to appropriate the waters of Sage Hen Creek for mining and milling purposes. (Knapp-USGS)
W75-03985

A COMBINED SYSTEM CONCEPT FOR POWER GENERATION AND WASTEWATER RENOVATION,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
For primary bibliographic entry see Field 5D.
W75-04227

3F. Conservation In Agriculture

IRRIGATION DITCH LINER AND METHOD FOR MAKING SAME,
For primary bibliographic entry see Field 4A.
W75-03863

MEANS FOR ROTATABLY SUPPORTING AN OVERHEAD IRRIGATION PIPE,
Lindsay Mfg. Co., Nebr. (assignee)
A. L. Zimmerer, B. J. Zimmerer, and P. B. Zimmerer.
US Patent No 3,851,659, 3 p, 5 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 929, No 1, p 117, December 3, 1974.

Descriptors: *Patents, *Irrigation systems, *Water distribution(Applied), *Water management(Applied), Distribution systems, Pipes.

A self-propelled irrigation system has a water distribution pipe movable along a predetermined path and a means for supplying water to the pipe. Spaced apart, self-propelled towers along the length of the pipe support it above the ground and propel the pipe along its predetermined path. At least some of the towers have a sleeve through which the pipe freely rotatably extends to permit the towers to traverse irregular ground without imposing twist stress in the pipe. At least some of the towers are rigidly connected to the pipe so as to prevent rotational movement of the towers with respect to the pipe. (Sinha-OEIS)
W75-03867

TRICKLE IRRIGATION SYSTEM,
J. R. Nye.
U. S. Patent No 3,843,056, 4 p, 4 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 927, No 4, p 1500, October 22, 1974.

Descriptors: *Patents, *Irrigation systems, *Irrigation practices, Equipment, Conservation, Land management, Water management(Applied), Crop production.
Identifiers: *Trickle irrigation.

The irrigation system includes a water supply source and a field of discharge pipes for dispensing water over the ground about growing crops. A pump is interconnected between the water supply source and the discharge pipe field. A first switch connects an electrical power source to the pump for activating and deactivating the pump. A second switch which includes means responsive to the rate of water flow through the pump or system will cause the pump to be deactivated when the water flow drops below a selected minimal flow rate. Also included is a means which isolates or deactivates the second or flow responsive switch for a short period of time when the first switch is initially shifted into its 'on' position to start the pump. This allows the irrigation system to be primed and air-purged without deactivation of the pump. The control unit for the irrigation system is contained within a compact housing which is adapted to rest upon the ground. A warning means, such as a light indicator, serves to note when the pump is deactivated through the operation of the second or flow responsive switch. (Sinha-OEIS)
W75-03877

INFLUENCE OF TOBACCO PLANT CANOPY ON PERCOLATION,
North Carolina State Univ., Raleigh.
D. L. Terry.
Agron J 65(5): 794-796, Illus. 1973.
Identifiers: Leaching, Lysimeters, Nicotiana-tabacum, *Percolation, Tension, *Tobacco, Loam, Sands, Soils, Plant canopy.

The relationship between percolation at various positions in Lakeland sand and Norfolk loamy sand soils under tobacco (Nicotiana tabacum L.) culture and the growth and development of the plant canopy was studied. A procedure is described for making direct measurements of percolation at various positions at a depth of 30 cm in a soil with respect to plant location as follows: (A) through a ridge directly below a plant; (B) through a ridge half way between 2 plants; (C) through a fallow ridge; and (D) through a fallow level area. During the 1st 15-20 days of the season percolation was similar at all positions studied and amounted to 40-60% of an average rainfall. From about 40 days after transplanting to the end of the growing season percolation at position A was about 40-100% of the rainfall while that at B and C was near zero. Percolation at D was intermediate averaging around 1/2 that of A. The large amount of percolation at A after canopy development was explained as the result of water being intercepted by the leaves and channeled to the base of the stalk. Percolation and possible leaching below 30 cm in a tobacco field are significant during the early part of the season (15-20 days from transplanting or later); however, after canopy development (40-49 days from transplanting or earlier) they are probably not significant except in a small soil volume directly below the plants.--Copyright 1974, Biological Abstracts, Inc.
W75-03931

APPRAISAL OF IRRIGATION PROJECTS AND RELATED POLICIES AND INVESTMENTS,
Ministry of the Presidency, Mexico City.
L. M. Bassoco, R. D. Norton, and J. S. Silos.
Water Resources Research, Vol 10, No 6, p 1071-1079, December 1974. 2 fig, 4 tab, 14 ref.

Descriptors: *Irrigation, *Projects, *Linear programming, *Investment, *Irrigation districts, *Mexico, Optimization, Decision making, Economics, Evaluation, Agriculture, Simulation analysis, Mathematical models, Systems analysis, Water policy.
Identifiers: Public policy, Interdependence.

Seven examples of analysis with linear programming models are presented to illustrate methods of treating interdependence in the appraisal of irrigation projects. The optimization

models are applied to public policy decisions in an environment where decision makers are concerned with the simultaneous use of several instruments of economic policy. Considered are the types of interdependence which affect the evaluation of irrigation investment projects and the use of linear programming for capturing this interdependence and for reflecting alternative goals in project evaluation. The kinds of interdependence analyzed are: (1) between investment projects and other policy instruments; (2) among different types of investment projects; and (3) between local and sector-level decisions on investment outlays. All three kinds are analyzed by linear programming models of irrigated agricultural producing areas, mostly with parametric programming experiments on these models. The models simulate producers' responses under different specified public policies. The applications discussed refer to irrigation districts in the central plateau and northwestern littoral of Mexico. Parametric linear programming is shown to be a useful tool for coping with this interdependence even in the absence of full project cost information. (Bell-Cornell)
W75-03933

PRICING IRRIGATION WATER IN IRAN,
Utah State Univ., Logan. Dept. of Economics.
B. D. Gardner, Y. Madhi, S. Partovi, H. Morteza, and S. Mehdi.
Water Resources Research, Vol 10, No 6, p 1080-1084, December 1974. 2 fig, 3 equ, 1 ref.

Descriptors: *Irrigation water, *Pricing, *Water supply, Water utilization, Management, Projects, Costs, Reimbursable costs, Water delivery, Operation and maintenance, Mathematical models.
Identifiers: *Iran.

Since its 1968 nationalization of water supplies, Iran has had the problem of setting prices for all water uses. Iran's institutional framework is described, and a pricing model for determining water charges is developed. A system is developed for pricing irrigation water delivered fo farmers from large multipurpose projects that are managed by water authorities directed to cover costs but make no profits. An irrigation project is divided into zones, and a single price is proposed for each zone. Operation and maintenance costs are set as a lower limit on price, and a certain fraction of ability to pay is set as an upper limit. Zones are ranked by assigned reimbursable costs, and a system is proposed that would produce water revenues in aggregate equal to total project reimbursable costs. For those zones where water is priced above reimbursable cost the price is set at that level where the price minus reimbursable costs, as a percentage of the difference between the upper limit and reimbursable cost, is the same for all zones. For those zones where the price is below reimbursable cost, the recommended price is at the upper limit. (Bell-Cornell)
W75-03936

EFFECTS OF LOW WATER POTENTIALS ON TRANSPIRATION AND PHOTOSYNTHESIS IN MITCHELL GRASS (ASTREBLA LAPPACEA),
Queensland Univ., Brisbane (Australia). Dept. of Botany.
For primary bibliographic entry see Field 2D.
W75-03938

WATER UTILIZATION AND AGRICULTURAL DEVELOPMENT IN WESTERN UTTAR PRADESH,
Indian Inst. of Management, Ahmedabad.
V. K. Gupta, P. S. George, and V. R. Gaikwad.
Available from the National Technical Information Service, Springfield, Va. 22161, as AICS-4, $10.60 in paper copy, $2.25 in microfiche. India Atomic Energy Commission, Argo-Industrial Complex Study Group, Ehabha Atomic Research Center. 1971. 271 p, 5 fig, 111 tab.

Descriptors: *Agriculture, *Irrigation, *Irrigation programs, *Irrigation districts, Irrigation water, Irrigation wells, Crop production, *Water utilization.
Identifiers: *Agro-information, *India, Farmers.

The purpose was to understand the parameters related to the cropping pattern, the use of irrigation facilities, and the participation of farmers in different organizations involved in agricultural development. Information important to the understanding of these aspects was acquired by questionnaires administered to farmers in three regions, each having a different percentage irrigated crop area. Of particular interest was the degree of utilization of the State tube-well organization by the farmers in the various regions. The state tube-well system was found to be a secondary source of irrigation water to private tube-wells. Although they were higher in cost, private tube-wells were preferred because of greater mechanical reliability, and assured and timely irrigation. Forty percent of the sample farmers reported they wanted more irrigation facilities. Farmers were found to depend maily on institutionalized sources for agro-information, and failed to mention Agricultural Development Officers from the agricultural department as an information source. (Mastic-Arizona)
W75-03950

SOME SOCIO-AGRICULTURAL CHANGES AS A RESULT OF INTRODUCTION OF IRRIGATION IN A DESERT REGION,
Central Arid Zone Research Inst., Jodhpur (India).
L. P. Bharara, S. P. Malhotra, and F. C. Patwa.
Annals of Arid Zone, Vol. 13, No 1, p 1-10. March, 1974. 5 tab, 8 ref.

Descriptors: *Irrigation, *Crop production, *Social change, *Land use, *Deserts, *Arid climates, Land development, Farming equipment, Labor, Labor mobility, Arid lands, Water distribution, Adoption of practices, Cultivated lands, Farm management, Fertilizers.
Identifiers: *India(Rajasthan Canal Project.)

The introduction of irrigation in the Rajasthan Canal-desert region caused changes in such socio-agricultural areas as occupational structure, land use, land distribution patterns, size of land holding, area sown, fallow land, agricultural inputs, and labor employment. The result of these changes was the appearance of farming communities. Labor shifted from handicraft and carpentry work to cultivation and agricultural labor. Although land holding per household decreased, the percent of area sown increased as a result of irrigation. Many in the landless class gradually have become landowners creating an increase in the number of agricultural labor jobs available. Crop farming became entirely mechanized in order to compete for higher commercialized production. (Mastic-Arizona)
W75-03951

EFFECT OF SOIL TEMPERATURE ON DIRECTION OF CORN ROOT GROWTH,
Ontario Ministry of the Environment, Toronto.
J. J. Onderdonk, and J. W. Ketcheson.
Plant Soil. Vol 39, No 1, p 177-186. Illus. 1973.
Identifiers: *Corn(Field), Growth notes, Mulch, Nutrients, Root growth(Corn), *Soil temperature, Soil moisture, Absorption.

More precise effects of soil temperature on the direction of corn root growth were determined by growing seedlings in soil for short periods in growth cabinets controlled to give a range of soil temperature conditions. The angle of growth (relative to the horizontal) was found to be minimum (10) deg. at constant 17C. Above or below this temperature (10-30C), a more vertical direction occurred. Cyclic temperatures also influenced direction, with the maximum of the cycle apparently determining the angle. The duration of the maximum temperature period in a cycle necessary to initiate a direction effect was not determined, however. The significance of these findings in the field is that modifications of soil temperatures by mulches, etc. probably influence the distribution of roots in the rooting zone of soils. This in turn means that plant behavior such as moisture and nutrient uptake can be better explained or managed for maximum performance.--Copyright 1974, Biological Abstracts, Inc.
W75-03954

TWO-DIMENSIONAL DISPLACEMENT INTO OR FROM WATER-FILLED DITCHES,
Arizona Univ., Tucson, Dept. of Soils, Water, and Engineering.
For primary bibliographic entry see Field 4A.
W75-03957

DISTRIBUTION OF HUMUS AND AVALABLE NUTRIENTS IN SOIL UNDER SOWN PASTURES IN AN ARID ENVIRONMENT,
Central Arid Zone Research Inst., Jodhpur, (India).
R. P. Dhir, and K. E. Gajbhiye.
Annals of Arid Zone, Vol. 12, No. 3 and 4, p 179-182, September/December, 1973. 1 fig, 1 tab.

Descriptors: *Humus, *Arid lands, *Fertility, *Soil tests, Pastures, Nutrients, Organic matter, Grasses, Soils, Root development.
Identifiers: *India (Jodhpur.)

As a part of a continuing study on fertility status of soils under grass, samples were taken at horizontal distances of 12.5, 25, 50, and 75 cm. from clumps of grass with 1.5 m row spacing and 12.5 and 50 cm. for 1.0 m row spacing. At each horizontal location samples were taken at depth levels of 0-20, 20-40, and 40-60 cm. Analysis of the samples for humus with row spacings of 1.5 m shows content at the 12.5 cm. distance and 0-20 cm depth to be 0.32%, decreasing to 0.26% at 75 cm. distance. The same decreasing pattern of humus content can be seen at the 20-40 and 40-60 cm depths although it is less conspicuous. This effect is even more evident in distribution of nutrients such as phosphorus and potash where content is as much as 41% and 31% higher near the plants than at the midpoint between two rows. It appears that in spite of higher nutrient uptake near the plants, organic residues are responsible for maintaining higher availability of nutrients in the vicinity of the grass clumps. (Mastic-Arizona)
W75-03958

AGRONOMIC SURVEY OF JOJOBA IN CALIFORNIA,
California Univ., Riverside. Dept. of Plant Sciences.
D. M. Yermanos.
Economic Botany, Vol. 28, No. 2, April-June, 1974. p 160-174, 1 tab, 10 fig, 12 ref.

Descriptors: *Crop production, *Semiarid climates, *Plant morphology, *Seeds, *Drought resistance, Market value, Harvesting, Chemical properties, Cultivation, Plant growth, Protiens, Amino acid, Irrigation, *California.
Identifiers: *Jojoba, Sperm whale oil, Wax.

Two possibilities are considered for the commercial production of jojoba seed: (1) harvesting the existing natural populations, and (2) establishing new cultivated stands of jojoba. The most important use suggested for jojoba is to replace sperm whale oil with the liquid wax extracted from its seed. Renewed attention is being given to this possibility since the sperm whale has been placed on the endangered species list, and the importation of this oil has been banned in the United States. Jojoba could become a viable crop for semi-arid lands if action is taken soon to plant for jojoba production. Jojoba has good marketing potential. Large seed production could be based on wild

stands for a few years while jojoba plantations are established to eventually take over all production. Action should be taken before synthetic substitutes are developed which would eliminate the potential market. (Mastic-Arizona)
W75-03960

DETERIORATION OF CONCRETE DITCH LINERS IN SALINE-ALKALI SOIL,
Agricultural Research Service, Brawley, Calif. Imperial Valley Conservation Research Center.
For primary bibliographic entry see Field 8F.
W75-03966

RELATION OF SOYBEAN LEAF WATER POTENTIAL TO SOIL WATER POTENTIAL,
Kansas Agricultural Experiment Station, Manhattan. Evapotranspiration Lab.
R. A. Brady, W. L. Powers, L. R. Stone, and S. M. Goltz.
Agronomy Journal, Vol 66, No 6, November-December, 1974. p 795-798, 1 tab, 5 fig, 12 ref.

Descriptors: *Soil-water-plant relationships, *Soybeans, *Soil moisture, *Evaporation, *Irrigation efficiency, Soil moisture meters, Leaves, Microclimatology, Soil water.
Identifiers: *Soil water potential, Leaf water potential, Irrigation scheduling.

A study was made to determine if a relationship exists between soil water potential and soybean leaf water potential for the purpose of aiding irrigation scheduling. Leaf water potentials were measured in a pressure chamber, soil water potentials were estimated using moisture release curves, and volumetric soil moisture measurements were made with a neutron probe. Daily atmospheric evaporative demand caused an average decrease of 9 to 10 bars for leaf water potentials. Soybeam leaf water potential was responsive to changes in soil water potential during the podding as well as the vegetative stage. Although leaf water potential was not in a 1:1 ratio with soil water potential, the maximum values of the leaf water potential in early morning make an estimation of the soil water potential possible. Differences in leaf water potential between irrigated and nonirrigated soybeans were closely related to differences in soil water potential of irrigated and nonirrigated soil. (Mastic Arizona)
W75-03989

USEFULNESS OF ERTS-1 AND SUPPORTING AIRCRAFT DATA FOR MONITORING PLANT DEVELOPMENT AND RANGE CONDITIONS IN CALIFORNIA'S ANNUAL GRASSLAND,
California Univ., Berkeley. School of Forestry and Conservation.
For primary bibliographic entry see Field 4A.
W75-03990

EFFECT OF SOIL MOISTURE REGIMES, PHOSPHORUS AND NITROGEN ON N AND P UPTAKE BY BARLEY (HORDEUM VULGARE L.),
Haryana Agricultural Univ., Hissar (India).
H. C. Sharma, and R. M. Singh.
Indian J Agric Sci 43(1): 58-61, 1973.
Identifiers: *Barley, Hordeum-vulgare, *Nitrogen, *Phosphorus, *Soil moisture, Absorption, Fertilizers.

N and P uptake by 'NP 21' barley (Hordeum vulgare L.) was studied under varying soil-moisture regimes, levels of P and N on a clay-loam soil in 1966-68 at Udaipur. Barley irrigated at 25% available soil moisture removed 53.5% N and 51.4% P more than the unirrigated crop. Application of 40 kg N/ha increased the N and P uptake by 25.5 and 19.7% over the control, whereas application of 17.5 kg P/ha increased N and P uptake by 7.8 and 5.1%, respectively.--Copyright 1974, Biological Abstracts, Inc.
W75-03991

EFFECTS OF CCC ON DROUGHT RESISTANCE OF TRITICUM AESTIVUM L AND ZEA MAYS L,
Oxford Univ. (England). Dept. of Agricultural Science.
G. A. Robertson, and H. Greenway.
Ann Bot. Vol 37, No 152, p 929-934. 1973, Illus.
Identifiers: *Ammonium chloride, *Chloride compounds, *Drought resistance(Plants), Growth rates, Leaf, Regulators, Roots, *Transpiration, Triticum-aestivum, *Wheat, *Corn(Field).

Application of CCC ((2 chloroethyl)-trimethyl ammonium chloride) to wheat and maize reduced transpiration in both soil and solution cultures. This reduction in transpiration was a result of CCC reducing leaf area and increasing the root/shoot ratio. CCC-treated plants did not increase tolerance to internal water deficits induced by osmotic shocks or desiccation. CCC did increase the drought resistance of young wheat and maize plants, but only by delaying the onset of severe internal water deficits, i.e. by drought avoidance.--Copyright 1974, Biological Abstracts, Inc.
W75-04011

EFFECT OF A KILLED SOD MULCH ON NITRATE MOVEMENT AND CORN YIELD,
Kentucky Univ., Lexington.
G. W. Thomas, R. L. Blevins, R. E. Phillips, and M. A. McMahon.
Agron J. Vol 65, No 5, p 736-739. 1973, Illus.
Identifiers: *Corn(Field), Evaporation, *Mulch, *Nitrates, Nitrogen, Poa-pratensis, Sod mulch, Soils, Loam, Soil moisture, Bluegrass sod, Fertilizers.

Corn (Zea mays L.) was planted in a Maury silt loam soil under conventional tillage and in a chemically-killed bluegrass (Poa pratensis L.) sod in 1970 and 1971 in order to determine the behavior of nitrate and the yield of corn under both cultural systems. Nitrate under both cultural treatments was sampled before and after June rainfall periods in both years. A large fraction of the nitrate was lost from the top 90 cm of soil under the killed-sod plots, whereas, no nitrate was lost from the conventionally-tilled plots. The loss of nitrate under the killed sod was attributed to 2 factors: lower evaporation from the mulched soil; and deep penetration of water and nitrate through larger pores in the wetter, mulched soil. Corn yields where N was applied tended to be higher on the killed-sod plots in a dry year (1970) and about the same in a wet year (1971). However, the no N treatment on the mulched plots had a much lower yield than did the conventionally-tilled no N treatment in the wet year of 1971. Higher N rates may be required when corn is grown in a killed sod mulch as compared to conventionally-tilled corn.--Copyright 1974, Biological Abstracts, Inc.
W75-04013

NITRATE AND CHLORIDE ACCUMULATION AND DISTRIBUTION IN FERTILIZED TILE-DRAINED SOILS,
Minnesota Univ., St. Paul. Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W75-04022

USE OF BLACK POLYETHYLENE MULCH TO REDUCE FLOODING EFFECTS ON TOMATO YIELDS,
Department of Agriculture, Harrow (Ontario). Research Station.
E. F. Bolton, and J. W. Aylesworth.
Can J Plant Sci. Vol 53, No 4, p 857-861. 1973, Illus.
Identifiers: *Flooding reduction, Lycopersicon-esculentum, *Mulch, Oxygen diffusion, Roots, Soil temperature, *Tomato, Crop production.

Processing tomatoes (Lycopersicon esculentum Mill.) grown expermentally under black polyethylene mulch in the field on Brookston clay soil produced 18.3 tons/ha more tomatoes than when grown without mulch during the 1966-71 period. Although this yield increase occurred each year it was most pronounced during seasons when soil flooding inflicted varying degrees of injury on the tomato crop. Soil temperature measurements in 1970 and 1971 indicated that a higher temperature regime existed under the black polyethylene, a factor associated with high yield. O2 diffusion rates were equivalent under both polyethylene and unmulched soil during periods of flooding. Greater root volume was apparently the main effect of black polyethylene mulch in producing high yields under flooded conditions.--Copyright 1974, Biological Abstracts, Inc.
W75-04030

THE DEVELOPMENT OF SUPPLEMENTAL WATER: RESOURCE FLEXIBILITY AND FARM MANAGEMENT OPTIONS,
Utah State Univ., Logan. Dept. of Economics.
R. Willis.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 224, $3.75 in paper copy, $2.25 in microfiche. Agricultural Economics Series 1974-2, September 1974. 43 p, 6 tab, 23 ref. OWRT C-4361(9052)(1).

Descriptors: *Farm management, *Supplemental irrigation, Investment, *Benefits, *Investment, *Project post-evaluation, Management, *Alternative water use, *Utah.
Identifiers: *Bureau of Reclamation, Projects evaluation, Supplemental water, *Management options.

The purpose has been to identify, measure, and assess the impact of pecuniary and technological external (management options) benefits that have been realized by primary beneficiaries following Bureau of Reclamation project water deliveries. Two categories, direct and indirect water and land related management options were used to evaluate the magnitude of change correlated to management options. Six Bureau of Reclamation projects and two time periods were used in the evaluation process. Results confirm the hypothesis that management options do exist. An average of about 15% of irrigated acres have been shifted to less intensive cropping practices. Each of these shifted acres required about twice as much irrigation water as previously grown crops. Net gains on irrigated acres were $14.82, $11.81, $2.39, $3.62, $13.95, and $58.78, respectively, for Emery, Vernal, Silt, Florida, Mann Creek, and Minidoka. Indirect gains have occurred in sales of storage water (about $300,000) and water values (about $200 per acre or more) that have been capitalized into land prices. These management options have had a positive impact upon individual farm family well-being. In view of the difficulties and problems encountered in project feasibility criterion and funding process, there is a need for pecuniary and technological benefit measurements. Measurement and inclusion of these benefits could be a significant input into public investment decisions.
W75-04031

EVALUATION OF IRRIGATION SYSTEMS IN THE SNAKE RIVER FAN, JEFFERSON COUNTY, IDAHO,
Idaho Univ., Moscow. Dept of Agricultural Engineering.
G. D. Galinato.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 237, $6.25 in paper copy, $2.25 in microfiche. Master's Thesis, May 1974. 140 p, 30 fig, 10 tab, 37 ref. OWRT B-028-IDA(1) and B-033-IDA(1).

Descriptors: *Irrigation efficiency, *Irrigation systems, *Furrows, *Border irrigation, *Furrow irrigation, Drainage, Drainage systems, Deep percolation, *Surface runoff, Ponding, Infiltration, Soil moisture, Data processing, *Idaho.
Identifiers: *Snake River(Ida).

Representative fields in the Snake River Fan, Jefferson County, Idaho, were selected to measure and evaluate the water application efficiencies of two irrigation systems presently employed. Within these fields, specific furrows and border strips were chosen for description and analysis in evaluating the performance of these irrigation systems. Results of water application efficiency tests showed an average efficiency of 24 percent for border irrigation and 51 percent for furrow irrigation. Since there was no surface runoff, the water that was lost went to deep percolation. The dominant reasons for low water application efficiencies were long durations of irrigation for high intake rate soils and long irrigation runs. Water application efficiencies should be improved by redesigning the present systems, particularly by adding drainage systems to prevent ponding of excess water, and by proper attention and judgement by the irrigator during irrigation. (Mastic-Arizona)
W75-04032

A FIELD STUDY OF THE HEAT AND DROUGHT TOLERANCE OF GRAIN SORGHUM (SORGHUM BICOLOR (L.) MOENCH) AS AN APPROACH TO GENETIC IMPROVEMENT,
Nebraska Univ., Lincoln. Dept. of Agronomy.
For primary bibliographic entry see Field 2I.
W75-04044

FLUE-CURED TOBACCO YIELD AND OXYGEN CONTENT OF SOIL IN LYSIMETERS FLOODED FOR VARIOUS PERIODS,
Agricultural Research Service, Florence, S.C. Coastal Plains Soil and Water Conservation Research Center.
R. B. Campbell.
Agron J. Vol 65, No 5, p 783-786. 1973, Illus.
Identifiers: Alkaloids, Flooded crops, *Lysimeters, Nicotiana-Tabacum, Oxygen depletion(Soil), Soils, Sugars, *Tobacco, Crop production.

Tobacco (Nicotiana tabacum L. cv. 'Coker 298') plants grown in lysimeters were flooded for 0, 12, 24, 48, 96 and 120 hr to define more clearly O2-depletion rates in soil and effects of flooding on growth. The O2 content of air entrapped in soil pores was monitored with membrane-covered galvanic-type probes before, during and after a 96-hr flooding. O2 decreased from 16 to less than 4% in the soil atmosphere within 24 hr after flooding. Upon drainage, O2 increased within 48 hr to the original concentration. Growth and yield differences between the control and 12- and 24-hr flooding treatments were not significant. Flooding for longer than 48 hr significantly reduced yield to less than 40% of that of the unflooded plants. Plants were more susceptible to flood damage at the 12-leaf stage of development than at the 17-leaf stage. Reducing sugars increased from 11.8 to 14.8% and total alkaloids decreased from 1.26 to 0.76% in tobacco leaves flooded for 24 hr.--Copyright 1974, Biological Abstracts, Inc.
W75-04111

CROPPING PATTERNS INVOLVING RICE AND THEIR MANAGEMENT,
Rothamsted Experimental Station, Harpenden (England). Dept. of Chemistry.
P. K. R. Nair, Ambika Singh, and S. C. Modgal.
Indian J Agric Sci. Vol 43, No 1, p 70-76. 1973, Illus.
Identifiers: *Crop management, Oryza-sativa, Puddline soil, *Rice, Soils, Transplanting, Cropping patterns, Farm management.

The feasibility of including rice (Oryza sativa L.) in intensive cropping patterns was explored, and the merits of 2 soil-management systems for rice (direct seeding in unpuddled soil and transplanting in puddled soil) in such patterns was evaluated from a field experiment conducted during 1969-71. For the agronomic, economic and management aspects, it was found more desirable to avoid the puddling soil, and consequently transplanting. However, transplanting reduced the effective total crop duration of the cropping pattern by 20 days.--Copyright 1974, Biological Abstracts, Inc.
W75-04127

STUDIES OF TILLAGE-FERTILITY ON PEARL MILLET IN SANDY ARID PLAINS OF RAJASTHAN,
Central Arid Zone Research Institute, Jodhpur (India).
S. D. Singh, R. C. Singh, D. L. Vyas, D. K. Misra, and N. S. Bhati.
Annals of Arid Zone, Vol 12, No 3 and 4, September/December, 1973. p 145-154, 2 fig, 7 tab, 8 refs.

Descriptors: *Cultivation, *Fertilization, *Crop production, *Arid lands, *Plant growth, Fertilizers, Nitrogen, Farm wastes, Dry farming, Rainfall, Emerging vegetation stage, Germination.
Identifiers: Pearl millet.

This study was undertaken to determine the best method of tillage in relation to nitrogen levels for pearl millet grown under natural rainfall conditions in the sandy arid soils of Rajasthan. Five methods of tillage were tried in addition ot fertilizer treatments with farm manure and ammonium sulfate. Tillage methods consisted of plough-plant, 1-ploughing by country plough, 2-ploughing by country plough, 1-harrowing, and 1-harrowing plus 1-ploughing by country plough. No significant differences in seedling emergence was observed due to any of the treatments, but germination on the plough-planted plot was slightly lower. Soil in the plough-planted plot was found to be more porous than in the other methods. Application of ammonium sulfate gave better yields than the organic source on an equal nitrogen basis. The minimum rate of nitrogen advocated for dryland farming was 10 kg. per hectare. (Mastic-Arizona)
W75-04129

PRELIMINARY STUDY ON MOVEMENT OF AVAILABLE WATER IN SANDY LOAM SOILS UNDER DRY FARMING CONDITIONS,
Gujarat Soil Conservation Research, Demonstration and Training Centre, Vasad (India).
R. Dayal, A. Singh, and N. H. Saraf.
Annals of Arid Zone, Vol 12, No 3 and 4, September-December, 1973. p 172-178, 5 tab, 2 fig.

Descriptors: *Rainfall, *Root zone, *Plant growth, *Moisture availability, *Water utilization, *Dry land farming, Soil water movement, Evapotranspiration, Crops, Loam, Evaporation, Soil surface, Semi arid climates, Reclamation(Soil), Tobacco.
Identifiers: Vasad(Gujarat).

Planting during the early stages of rainfall provides better moisture availability and utilization during crop growth. Late planting has shown that there is a deficit of moisture in the effective root zone at the later crop growth stages which causes low yields. Availability of water from the major root depth (0-90 cm.) can only be insured with early planting. The evapotranspiration ration increases with late planting showing that loss of conserved moisture by evaporation from the soil surface increases with the delay in planting. Planting in July in the semi-arid area of Vasad would take advantage of rain water availability. (Mastic-Arizona)
W75-04133

IRRIGATION'S IMPACT ON SOCIETY.
Arizona Univ., Tucson. Dept. of Anthropology.
University of Arizona Press, Tucson. 1974. 181 p, 34 fig, 285 ref. University of Arizona, Anthropological Papers, no. 25. T. E. Downing and M. Gibson, eds.

Descriptors: *Irrigation systems, *Social impact, *History, *Archaeology, Agriculture, Irrigation design, Canals, Flow, Flood irrigation, Salinity, Conveyance structures, Fallowing, Water management(Applied), Southwest US, Mexico, Deserts, Spatial distribution.
Identifiers: *Irrigated agriculture, Peru, Iran, Mesopotamia, Middle East.

These papers were prepared for a 1972 symposium on the relationship of irrigation to society, with the emphasis on the problem of relating the complexity of social organization to the complexity of water-control problems. Despite the diversity of disciplines represented by the participants, certain themes emerge: Notions of cycles, the discovery of relevant elements of the physical irrigation system, comparable water-control solutions by unrelated cultures, a tendency toward contralization spawned by scarcity, and finally a recognition of the need for anthropologists/archaeologists to delve more deeply into the fields of the geographer/hydrologist. Individual papers cover in considerable detail such topics as historic patterns of Mesopotamian irrigation agriculture, organizational preadaptation to irrigation, irrigation and steelement patterns, conservation and diversion, irrigation development and population pressure, the State's use of irrigation in changing peasant societies; and others that are addressed particularly to Peru's coastal deserts; a case of irrigation, conflict, and politics in Mexico; and a water-control system practiced by prehistoric peoples of the American southwest. The papers proceed from a consideration of natural factors, including population, to view irrigation as yet another means for adapting to a specific environment. (Paylore-Arizona)
W75-04138

CORN ROOT-CONFIGURATION RESPONSE TO SOIL TEMPERATURE AND MATRIC SUCTION,
Agricultural Research Service, Pendleton, Oreg. Columbia Plateau Conservation Research Center.
R. R. Allmaras, and W. W. Nelson.
Agron J. Vol 65 No 5, p 725-730. 1973, Illus.
Identifiers: *Corn(Field), Matric suction, Moisture, Mulch, Residues, *Roots, *Soil temperature, Straw, Tillage.

Soil temperature and water variables imposed on the roots of corn (Zea mays L.) in field plots influenced root development. Responses were measured in separate portions of the root system where adventitious roots initiate and subsequent root elongation and branching occurs. These portions of the corn root system are separated far enough to permit specific field management for each portion. Temperature and water variables were produced by combinations of straw-mulch strips and interrow tillage. Initiation of adventitious roots in the 0- to 10-cm soil depth was dominantly influenced by soil temperature in the row. In soil depths below 10 cm, a functional relation between root configuration and the interrow-minus-row soil temperature, and matric suction described the elongation and branching responses subsequent to root initiation. In the year of lower soil temperature and higher moisture (measurements were made in 2 growing seasons), higher interrow temperatures stimulated branching and elongation, but in the year of higher soil temperature and moderate moisture conditions, responses to temperature were negligible. Higher interrow moisture, stimulated branching and elongation in both years as long as the average matric suction was greater than about 85 mb. These explicit descriptions of corn-root-configuration response show the importance of soil temperature management in the row and water management in the interrow. This approach permits more extensive use of the row-interrow concept for design of minimum tillage and residue management systems.--Copyright 1974, Biological Abstracts, Inc.
W75-04288

PERFORMANCE OF SULFURCOATED UREA UNDER INTERMITTENTLY FLOODED RICE CULTURE IN PERU,
North Carolina State Univ., Raleigh. Coleander National Rice Program Peru.
P. A. Sanchez, A. Gavidiao, G. E. Ramirez, R. Vergara, and F. Minguillo.
Soil Sci Soc Am Proc. Vol 37, No 5, p 789-792. 1973, Illus.
Identifiers: *Fertilizers, Flooded crops, Grains, Growth rates, Crop management, Nitrogen, Oryza-Sativa, Performance, *Peru, *Rice, Sulfur, *Urea(Sulfurcoated), Vegetation, Crop production, Absorption.

Short-statured, high yielding rice (Oryza sativa L.) varieties grown extensively in northern Peru require extremely high rates of conventional N sources to achieve maximum yields. The recovery of applied N is extremely low due to the use of intermittent flooding. This water management system results in heavy N losses even with properly timed split applications. In search of simpler and more efficient methods of N management, 8 field experiments were conducted in the region to evaluate S-coated urea (SCU), an experimental, slow-release N source supplied by the Tennessee Valley Authority. Rice yields were increased an average of 59% more by pretransplant-incorporated SCU than by urea or (NH4)2SO4 applied in the same manner. SCU produced an average of 20% higher grain yield response than topdressed applications of urea or (NH4)2SO4. SCU applications increased panicle production, N uptake at harvest, and the apparent recovery of added N. Beneficial effects of SCU were more pronounced in sites where check yields were low, especially less than about 4.8 ton/ha. In sites with high N supplying capacity, SCU produced excessive vegetative growth which resulted in yield reductions at high N rates. Regardless of an assumed 48%-higher unit N cost in SCU, the overall benefits of pretransplant-incorporated applications of SCU were favorable since there was a decrease of 40% in the optimum rate of N and the need for precise timing of application was eliminated.--Copyright 1974, Biological Abstracts, Inc.
W75-04313

EFFECT OF LEVEL TERRACES ON SOIL MOISTURE CONTENT AND UTILIZATION BY CORN,
Iowa State Univ., Ames.
E. L. Miller, and W. D. Shrader.
Agron J. Vol 65, No 4, p 600-603. 1973, Illus.
Identifiers: *Corn(Field), Nitrogen, Phosphorus, *Soil moisture, *Terraces, Soil density, Crop production, *Fertilizers, *Iowa.

Field experiments were conducted to determine the effect of sod-stabilized backslope level terraces on soil moisture content and the utilization of moisture by corn (Zea mays L.). Plots were located in the terrace interval and in terrace channel positions up-slope from 9 different terraces, on a watershed, in the Ida-Monona soil association area of southwestern Iowa. Periodic measurement of soil moisture in the root zone, daily observation of weather variables, and corn development and yield measurements were made for each plot and were used to evaluate soil moisture content and utilization by corn. Soil moisture amounts in the rooting zone were greater in terrace channels than in terrace interval positions on all sample dates, with differences ranging 1.98-6.27 surface cm and averaging 5 cm in the surface 1.83 m of soil. Significant yield differences between positions occurred, and moisture-stress intensity was a significant factor in explaining yield variations. Other factors that were significant in explaining the variation in yield were plant density and plant N and P contents. A yield-response curve was developed, which characterized the relationship between corn yield and moisture stress intensity.--Copyright 1974, Biological Abstracts, Inc.
W75-04315

EFFECT OF TRACTOR TRAFFIC, SURFACE MULCH AND SEEDBED CONFIGURATION ON SOIL PROPERTIES,
Agricultural Research Service, Big Spring, Tex.
P. T. Koshi, and D. W. Fryrear.
Soil Sci Soc Am Proc. Vol 37, No 5, p 759-762. 1973, Illus.
Identifiers: Bulk, Conductivity, Gossypium-Hirsutum, Hydraulics, *Mulch, Organic matter, Porosity, *Seedbed configuration, *Soil properties, Surface, *Tractor traffic, *Texas(Southern High Plains), *Cotton, *Sandy soils, Soil density, Soil compaction.

The effects of 3 seedbed configurations, 4 mulch rates, and tractor traffic confinement on soil properties that affect soil-water relations of a sandy soil were tested with cotton as a test crop. The lack of water limits crop production on dryland sandy soils in the Southern High Plains. Undisturbed soil cores were taken from the 0-7.5, 7.5-15-, and 22.5- to 30-cm depths in the trafficked and nontrafficked interrows and crop rows of the flat, ridge and furrow treatments. Surface mulch rates of 0, 5.6, 11.2 and 22.4 tons/ha of cotton-bur mulch were applied annually after seedbed preparation to each split plot. Tractor traffic was confined to the same path each year using cotton (Gossypium hirsutum L.) as a test crop. Mulching at rates more than 11.2 tons/ha reduced the bulk density, increased hydraulic conductivity, air porosity, total porosity, and organic matter content even in the trafficked interrows. Hydraulic conductivity of the crop rows increased 8-fold with heavy mulch applications. Hydraulic conductivity increased 3-fold, bulk density was reduced, and air porosity increased as a result of controlling tractor traffic even without mulch.--Copyright 1974, Biological Abstracts, Inc.
W75-04316

EFFECT OF MOISTURE REGIMES AND GREEN MANURING ON FERROUS IRON CONCENTRATION IN SOIL AND GROWTH AND YIELD OF PADDY,
Illinois Univ., Urbana.
I. K. Jaggi, and M. B. Russel.
J Indian Soc Soil Sci. Vol 21, No 1, p 71-76. 1973, Illus.
Identifiers: *Ferrous iron, Flooding, Growth rates, Moisture content, Organic matter, Paddy, Soil moisture, *Crop production, *Farm wastes, Fertilizers, *India, *Clay loam.

In the 1970 kharif season, a field experiment was conducted on a clay loam soil of Jabalpur, Madhya Pradesh, India, to determine the state of oxidation of paddy soil and the yield of paddy under 2 water levels and 2 levels of added organic matter. Water level was maintained 5 cm above and 10 cm below the soil surface in 3.6 m x 3.6 m plots. Split treatments of no added organic matter and of 18000 kg/ha (dry weight) green Ipomoea were applied to each water level treatment. The concentration of ferrous Fe in the 0-5 cm surface soil receiving organic matter and surface flooding attained its maximum limit of 200 ppm after 6 weeks of flooding and then declined to 1000 ppm. These concentrations were 10-20 times higher than those measured in the other 3 treatments . Average paddy yields were 69, 54, 68 and 64 quintals/ha for the flooded plots without and with organic matter, respectively. None of the treatments significantly influenced the weight of roots per unit volume of soil at depths of 0-10, 10-17.5 and 17.5-25 cm.--Copyright 1974, Biological Abstracts, Inc.
W75-04318

ISOLATED SOIL COLUMNS FOR PLANT RESEARCH: PROCEDURE AND UNIFORMITY TRIAL,
Agricultural Research Service, Logan, Utah.
W. Keller, A. T. Bleak, and A. C. Hull, Jr.
Agron J. Vol 65, No 5, p 720-722. 1973, Illus.
Identifiers: Hordeum-Vulgare, Lysimeters, *Precipitation(Atmospheric), Procedures, *Soil columns, *Barley, Uniformity trials, *Crop production.

Isolated soil columns offer one means of studying the influence on yield and other plant characteristics of different amounts of precipitation while other environmental factors are unaltered. These columns may be regarded as an inexpensive substitute for lysimeters. This study describes the establishment of 67 columns 1.22 m2 in a single row in 1967 and 79 and 88 columns in adjacent rows in 1969. The 1st year after establishment, a uniform crop of barley (Hordeum vulgare L.) was grown on the isolated columns as well as on 2 opposite sides. Coefficients of variation for total yield of barley ranged 8.17-11.42%. A brief description is given of catchments to increase precipitation on the plots by 50% or to reduce it by 33%. These catchments are being used in studies with perennial forage species.--Copyright 1974, Biological Abstracts, Inc.
W75-04321

EFFECT OF STORED SOIL MOISTURE RESERVE THROUGH CONSERVATION PRACTICES AND SUPPLEMENTAL IRRIGATION ON WHEAT YIELD UNDER DRYLAND FARMING CONDITION,
Indian Agricultural Research Inst., New Delhi (India).
C. R. Hazra, S. B. Ray, and T. D. Biswas.
J Indian Soc Soil Sci. Vol 21, No 1, p 9-22, 1973, Illus.
Identifiers: Bulk, Density, *Dryland farming, Farming, *Irrigation(Supplemental), Mulch, *Soil moisture, Straw, *Wheat yield, *Mulches, Infiltration, Moisture conservation(Soils), *India.

The surface configuration treatments for better infiltration of rain water during the kharif (rainy) season were effective in checking runoff and causing higher water infiltration. Moisture conservation was greatly increased with the application of mulches on the soil surface. The mulches (polyethylene sheet and wheat straw) reduced evaporation from the soil, improving the soil moisture status at the sowing time of wheat in the rabi (dry) season; that consequently increased seedling emergence. Soil bulk density decreased while organic C content of the soil and infiltration of water into soil increased under both the mulches (polyethylene and straw). Surface configuration treatments did not have much effect on the yield of wheat while mulches significantly improved the yield. Supplemental irrigation treatments improved grain yield. Positive interaction effect was observed between mulches and supplemental irrigations on grain yield during the dry growing season.--Copyright 1974, Biological Abstracts, Inc.
W75-04346

EFFECT OF NITRATE AND SEDIMENT CONSTRAINTS ON ECONOMICALLY OPTIMAL CLAY PRODUCTION,
Illinois Univ., Urbana. Agricultural Experimental Station.
For primary bibliographic entry see Field 4D.
W75-04349

4. WATER QUANTITY MANAGEMENT AND CONTROL

4A. Control Of Water On The Surface

METHODOLOGIES FOR OPERATING RESERVOIRS FOR SHORT-TERM FLOOD CONTROL,
Cornell Univ., Ithaca, N.Y. Dept. of Operations Research.
J. R. Fergusson.

Available from the National Technical Information Service, Springfield, Va 22161, as PB-239 108, $9.50 in paper copy, $2.25 in microfiche. Technical Report No 85, Cornell University Water Resources and Marine Sciences Center, Ithaca, New York, September 1974. 334 p, 22 fig, 8 tab, 83 ref. OWRT C-5240(No 4230)(1). 14-31-0001-4230.

Descriptors: *Reservoir releases, *Flood control, *Methodology, *Linear programming, *Optimization, *Scheduling, Reservoir operation, Damages, Costs, Water resources, River systems, Management, Constraints, Mathematical models, Systems analysis.

The task of scheduling releases from reservoirs in a river system during a flood so as to minimize total damage is examined from the perspective of mathematical modelling. The problem is formulated using separable programming, involving the minimization of piecewise-linear damage functions which are generally nonconvex and possibly discontinuous, subject to linear constraints. Some analytic properties of this model are given, including solution characterizations for two simple reservoir system structures. Due to the difficulty of extending these results, it is concluded that numerical solution techniques are required. These are developed in detail in a general setting, so that they apply to arbitrary separable programming problems with linear constraints. Initially, cost function continuity is assumed; this is later relaxed to assume discontiunities. The resulting methods are thus applicable to most separable programming problems arising in practice, including the short term flood control reservoir operating problems. Benders' decomposition techniques are also developed for problems in which a subset of the cost functions are convex. Based on a limited amount of computation experience, it is tentatively concluded that lower convex approximation is the best of the above methods when cost functions are nearly convex, while the one based on monotonicity is preferable when they are nearly concave. (Bell-Cornell)
W75-03855

SOME POLITICAL AND ECONOMIC ASPECTS OF MANAGING CALIFORNIA WATER DISTRICTS,
California Univ., Los Angeles. Inst. of Government and Public Affairs.
For primary bibliographic entry see Field 6B.
W75-03856

IRRIGATION DITCH LINER AND METHOD FOR MAKING SAME,
H. Nienstadt.
US Patent No 3,854,292, 3 p, 8 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 945, December 17, 1974.

Descriptors: *Patents, *Irrigation ditches, *Water distributions(Applied), Ditches, Resins, Plastics, *Linings, Protective coatings.
Identifiers: Glass fiber reinforced plastic, Polyester, *Channel liners, Prefabricated liners.

Liner sections are prefabricated with glass fiber reinforced plastic resin, preferably polyester. The glass fiber is in the form of a mat having fibers in random orientation, and more or less felted together. Different types of polyester may be used in accordance with the temperature and ground conditions, and the characteristics may be tailored throughout the length of the ditch or channel to have different characteristics at different portions. In particular, flexible or semi-flexible sections are provided every so often to take up for thermal expansion and contraction and for use in areas where the ground is likely to shift somewhat. Furthermore, in areas which are likely to be dry from time to time, fire resistant or retardant polyester or other resins may be used. Each prefabricated section, which may be many feet in length, and from approximately 1/8 inch thickness on up, has at the opposite ends thereof a section of glass fiber mat, for example on the order of 4 to 6 inches, which is not covered with resin. Liquid resin is coated on the previously uncoated fiber at the end of each section during installation, and the mats from one prefabricated section to another are overlapped. When the fresh resin sets up, a continuous channel liner is provided. (Sinha-OEIS)
W75-03863

EVALUATION OF INTERREGIONAL INPUT-OUTPUT MODELS FOR POTENTIAL USE IN THE MCCLELLAN-KERR ARKANSAS RIVER MULTIPLE PURPOSE PROJECT IMPACT STUDY,
Catholic Univ. of America, Washington, D.C. Inst. of Social and Behavioral Research.
U. Kim.
IWR Contract Report 74-6, submitted to U.S. Army Engineer Institute for Water Resources, Fort Belvoir, Va., Aug 1974. 99 p, 11 map, 4 tab, 80 ref. DACW 31-72-C-0059.

Descriptors: *Evaluation, *Input-output analysis, *Multiple-purpose projects, *Model studies, Industries, Economics, *Data collections, *Regional analysis, Measurement, Surveys, Investment, Bibliographies, Equations, Systems analysis.
Identifiers: *Impact studies, *Arkansas River Project, Trade, Long-range impact, Impact assessment, Interregional.

A number of operational multi-regional and single region input-output models are evaluated, and an empirically feasible, theoretically sound model is recommended for impact analysis of the Arkansas River project. First, some theoretical aspects of input-output (I/O) analysis are surveyed. A national model is explained through its structural, balance, and solutions equations. Discussed are a regional and an interregional model, Moses' model, Leontief's intranational model, a 'gravity' model, and linear programming and dynamic models. Next, four empirical works of interregional I/O studies are investigated, including the Harvard Study. The use is suggested of a modified revision of the Harvard University Multi-region Input-Output Model completed for the Economic Development Administration. To measure the project's impact on both industrial and regional interdependencies and to comprehend feedback effects, the construction is proposed of an interregional I/O model closed on national boundary. The proposed model is particularly effective in measuring both the direct and indirect impact a given change in demand would have upon the various industrial sectors in a region; it would measure impact on neighboring regions as well as on its own. The remainder of the report is devoted to a data collection plan for the interregional I/O model. (Bell-Cornell)
W75-03923

DESIGN OF A CONDUIT SYSTEM WITH DIVERGING BRANCHES,
North Carolina State Univ., Raleigh. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 8A.
W75-03930

EVALUATING MULTIRESERVOIR OPERATING RULES,
Ecole Polytechnique, Montreal (Quebec).
J. M. Mejia, P. Egli, and A. Leclerc.
Water Resources Research, Vol 10, No 6, p 1090-1098, December 1974. 8 fig, 1 tab, 16 equ, 4 ref.

Descriptors: *Reservoir operation, *Recreation, *Flow augmentation, *River systems, *Evaluation, Optimization, Simulation analysis, Linear programming, Hydrologic data, River basins, Hydrologic systems, Assessment, Multiple purpose, Water allocation(Policy), Summer, Lakes, Estimating, Constraints, Reservoir storage, Drawdown, Equations, Mathematical models, Systems analysis, Flow, Forecasting.
Identifiers: *Operating rules, Decision rules, Historical data, North River System(Canada), Effectiveness, Socioeconomic effects.

Decision rules for operating a multiobjective multireservoir system are evaluated. The effectiveness of alternative operating rules in meeting specified objectives is assessed for the North River system, located near Montreal, Quebec. The North River is regulated by an existing system of reservoirs for recreational and flow augmentation purposes. These objectives are translated into a set of criteria that makes the problem amenable to mathematical optimization, the emphasis then being on the utilization of hydrologic information and the incorporation of optimization procedures in four progressively more complex operating rules. The socioeconomic effects of the operating rules are estimated separately for each of the two uses, thereby establishing a basis for a subjective final evaluation. The rules range from the so-called standard policy to a policy incorporating multiple-period flow forecasting and sequential linear programming for determining the optimal allocation of the available water in space and time. Historical data are used to simulate the operation of the system under the different rules, and an assessment of the policies is made on the basis of multiobjective criteria. For the conditions of the North River reservoir system, the operation problem can be constrained and formulated so as to justify the incorporation of relatively simple optimization procedures in alternative operating rules. (Bell-Cornell)
W75-03932

CHANCE-CONSTRAINED DYNAMIC PROGRAMING AND THE OPTIMIZATION OF WATER RESOURCE SYSTEMS,
New South Wales Univ., Kensington (Australia).
A. J. Askew.
Water Resources Research, Vol 10, No 6, p 1099-1106, December 1974. 3 fig, 2 tab, 20 equ, 6 ref.

Descriptors: Water resources, *Dynamic programming, *Stochastic processes, *Probability, *Constraints, *Reservoir operation, *Reservoir releases, Optimization, Evaluation, Estimating, Economic efficiency, Annual, Costs, Benefits, Algorithms, Equations, Mathematical models, Systems analysis.
Identifiers: System failure, Chance-constrained programming, Operating policy, Benefit maximization.

To limit the probability of failure of a water resource system when it is operated in accordance with its optimum operating policy, such policy must be derived subject to relevant chance constraints. Using a stochastic dynamic program, certain of these constraints can be handled similarly to deterministic constraints, whereas others can be applied indirectly by imposing a penalty for failure, the optimum value of which can be found by an interative search. This search and a precise evaluation of the response of the system may be achieved within the dynamic program by means of minor additions to its basic algorithm. Application of this procedure to four single reservoir systems releasing water to meet a single demand domonstrates its suitability for deriving optimum operating policies for water resource systems and for estimating their response to given inputs and contraints. The object is usually benefit maximization (net), implying, among other things, that long-term economic efficiency is the only criterion on which to judge the significance of system failure. However, if the target release from a reservoir cannot be met, the socio-political implications of this failure may far outweigh any economic evaluation of the gravity of the situation. (Bell-Cornell)
W75-03934

OPTIMIZATION OF REAL TIME OPERATION OF A MULTIPLE-RESERVOIR SYSTEM,
California Univ., Los Angeles. Dept. of Engineering Systems.

L. Becker, and W. W-G. Yeh.
Water Resources Research, Vol 10, No 6, p 1107-1112, December 1974. 2 fig, 2 tab, 16 ref.

Descriptors: Water resources, *Reservoir operation, *Reservoir releases, *Linear programming, *Dynamic programming, Methodology, *Optimization, Reservoir storage, Inflow, Hydroelectric plants, Streamflow, Constraints, Algorithms, Computers, California, Water supply, Mathematical models, Systems analysis.
Identifiers: Real time, Operating rules, Policy period.

Presented is an optimization procedure for real time multiple-reservoir operation. The methodology is used to determine optimal operating rules for an existing multiple-reservoir and hydroelectric facility associated with the Shasta and Trinity subsystems of the California Central Valley Project. The problem is to derive the optimum release policy over the specified release periods, which will result in a set of ending storages in the final policy period that is known to be adequate for future system operation. The optimization criterion for each period is to operate so as to minimize the potential energy loss resulting from releases of stored water for various uses. The methodology uses a form of dynamic programming for the selection of an optimal reservoir storage policy path through the specified number of policy periods and a linear programming routine for period by period optimization. The policy periods, in case of real time operation, correspond to the number of time periods for which a streamflow prediction model is reasonably reliable. The method results in relatively easy computer implementation and high flexibility in that changes in constraints are simply made and additional reservoirs easily added. The method is of considerable value for determining release policies in real time operation of an existing system. (Bell-Cornell)
W75-03935

PROTECTING CREEKSHEDS: DEVELOPMENT AND EVALUATION OF A METHOD TO MANAGE SMALL, URBANIZING WATERSHEDS THROUGH LOCAL GOVERNMENT ACTIONS,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03947

TWO-DIMENSIONAL DISPLACEMENT INTO OR FROM WATER-FILLED DITCHES,
Arizona Univ., Tucson, Dept. of Soils, Water, and Engineering.
S. Miyamoto, and A. W. Warrack.
Soil Science Society of America, Proceedings, Vol. 38, No. 5, September-October, 1974. p 723-727, 1 tab, 5 fig, 11 ref.

Descriptors: *Ditches, *Saturated flow, *Spoil banks, *Drainage water, *Flow characteristics, Salts, Leaching, Fertilizers, Drainage engineering.

Piston-type displacement of solutes for steady-state saturated flow into or from water filled ditches is analyzed mathematically and by a sand tank method. The displacement front into the drains advances much faster near the drains than in the region midway between them. A spoil bank may be useful in reducing the amount of water needed to leach salts or in minimizing the loss of water applied fertilizers into drains. The displacement front for water moving from ditches into a field advances in an ellipsoidal pattern. Data obtained from the sand tank model agreed with the predicted fronts. (Mastic-Arizona)
W75-03957

VEGETATION MANAGEMENT FOR INCREASED WATER YIELD IN ARIZONA,
Arizona Univ., Tucson. Dept. of Watershed Management.
For primary bibliographic entry see Field 3B.
W75-03961

DETERIORATION OF CONCRETE DITCH LINERS IN SALINE-ALKALI SOIL,
Agricultural Research Service, Brawley, Calif. Imperial Valley Conservation Research Center.
For primary bibliographic entry see Field 8F.
W75-03966

HYDROLOGIC ANALYSIS OF THE MOJAVE RIVER, CALIFORNIA, USING A MATHEMATICAL MODEL,
Geological Survey, Menlo Park, Calif.
T. J. Durbin, and W. F. Hardt.
Water-Resources Investigations 17-74, November 1974. 50 p, 18 fig, 7 tab, 42 ref.

Descriptors: *Mathematical models, *Rivers, *California, *Water conveyance, Surface-groundwater relationships, *Water importing, Water loss, Infiltration, Analog models, Artificial recharge, Open channel flow.
Identifiers: *Mojave River(Calif), *Barstow(Calif).

A mathematical model predicts the effects of using the normally dry Mojave River, California, as a natural conduit system to convey imported water about 60 miles downstream to Barstow. The imported water would be used to replenish aquifers now being overpumped. From 1930 to 1972 only 18 floods at The Forks (headwaters of the Mojave River basin) produced flow at Barstow. The mathematical model simulates the flow characteristics down the initially dry channel and evaluates the potential of the channel to move water to Barstow. Results of simulation by modeling indicate that the channel of the Mojave River can be used efficiently to convey imported water to Barstow only when the absorption capacity of the channel has been reduced by an antecedent flood. An electric analog model was also utilized to predict water-level effects from potential recharge to the underground west of Barstow. (Knapp-USGS)
W75-03967

CREST-STAGE GAGING STATIONS IN OREGON--A COMPILATION OF PEAK DATA COLLECTED FROM OCTOBER 1952 TO SEPTEMBER 1974,
Geological Survey, Portland, Oreg.
For primary bibliographic entry see Field 7C.
W75-03969

WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN THE NORTHERN GREAT PLAINS COAL REGION OF EASTERN MONTANA, 1974-75.
Geological Survey, Helena, Mont.
For primary bibliographic entry see Field 7C.
W75-03977

WATER-RESOURCES DATA COLLECTED IN THE DEVILS HOLE AREA, NEVADA, 1973-74,
Geological Survey, Las Vegas, Nev.
For primary bibliographic entry see Field 7C.
W75-03978

QUALITY AND AVAILABILITY OF WATER IN WESTERNMOST TEXAS,
Geological Survey, El Paso, Tex.
For primary bibliographic entry see Field 2K.
W75-03979

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR BALDWIN LAKE, SAN BERNARDINO COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2H.
W75-03981

USE OF WATER IN GEORGIA, 1970, WITH PROJECTIONS TO 1990,
Geological Survey, Atlanta, Ga.
For primary bibliographic entry see Field 6D.
W75-03983

USEFULNESS OF ERTS-1 AND SUPPORTING AIRCRAFT DATA FOR MONITORING PLANT DEVELOPMENT AND RANGE CONDITIONS IN CALIFORNIA'S ANNUAL GRASSLAND,
California Univ., Berkeley. School of Forestry and Conservation.
D. M. Carneggie, S. D. Degloria, and R. N. Colwell.
Final Report to U.S. Department of the Interior, Bureau of Land Management, March 31, 1974. 53 p, 12 fig, 2 tab, 8 ref.

Descriptors: *Grasslands, *Remote sensing, *Aerial photography, *Range management, *Climatic data, *Spectrophotometry, Grazing, Forages, Crop production, Plant growth, Range grasses, Phenology, Reflectance, *California.
Identifiers: *Earth Resources Technology Satellite(ERTS-1) Wildfire.

The purpose was to determine if ERTS-1 imagery and supporting aircraft photography can: monitor growth and development in the annual grasslands of California, determine the relative amount of forage produced for a given area between years, and provide inputs for a model predicting forage condition and production using ground, spectroradiometric, and climatic data. The results showed a close correspondence between spectral reflectance ratios and green biomass. Changes in ground spectral reflectance data also correspond with observed changes in growth stage and condition of the forage species. Relative differences in forage production were also indicated by ERTS spectral radiance data. Repetitive sequences of ERTS color composite images can provide the means for monitoring change in condition and comparison of condition of different range areas. Anticipated benefits from ERTS monitoring includes: better planning for movement of grazing animals, estimating length of green feed periods for ranges enabling planning for alternative feed sources, determination of dry forage fire hazards, and assessing range conditions as a result of climatic conditions, whether drought or forage abundance. (Mastic-Arizona)
W75-03990

THE ULTRASONIC METHOD OF RIVER GAUGING,
Department of the Environment, Reading (England). Water Data Unit.
R. W. Herschy.
Water Services, Vol 78, No 940, p 198-200, June, 1974. 3 fig.

Descriptors: *Flow, *River flow, Rivers, Gaging, Networks, Gaging stations, Ultrasonics.
Identifiers: River gauging, *Ultrasonic methods, Great Britain.

The ultrasonic method of river gauging was designed to more accurately measure river flow in areas, where existing methods of river gauging are unsuitable, such as rivers influenced by navigation and locks. The ultrasonic method measures the velocity of flow at a certain depth by simultaneously transmitting sound pulses through the water from transducers on both sides of the river. The average velocity of the water at the depth of the transducers is directly related to the difference between the time of travel of the pulses crosing the river in an upstream direction and those travelling downstream. By incorporating an area factor in the electronic processor and relating the average velocity at the depth of the transducers to the average velocity of flow of the whole cross section, an output of discharge can be determined. Studies were done at River Pang at Pangbourne and at the River Thames at Sutton Courtenay and

the calibration and accuracy f the system were determined. (OrriFIRL)
W75-04026

AMBIENT CURRENT EFFECTS ON VERTICAL SELECTIVE WITHDRAWAL IN A TWO LAYER SYSTEM,
Oregon State Univ., Corvallis. Ocean Engineering Programs.
L. S. Slotta, and R. J. Charbeneau.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 234, $3.25 in paper copy, $2.25 in microfiche. Completion Report, Oregon Water Resources Research Institute, Corvallis, January 1975. 15 p, 7 fig, 1 tab, 17 ref. OWRT A-025-ORE(1).

Descriptors: *Withdrawal, *Gravity waves, Flow, Reservoir releases.
Identifiers: Interfacial gravity waves, Separating height, *Ambient current effects, *Two layer systems, *Selective withdrawal.

The study examined the way in which the selectivity of flow withdrawal into a vertically suspended, upper strata point sink is affected by an ambient current in a two layer system. The results show that an ambient current will influence the selectivity of a withdrawal flow, though the magnitude of the influence is small and is partially masked by the generation of interfacial gravity waves. If such waves can be excluded, then an ambient current would be expected to enhance the phenomenon of selective withdrawal. The generation of interfacial waves may be a more important consequence of an ambient current than its influence on the degree of selectivity; especially as the interfacial waves relate to the subsequent structure of the flow field. The results also show that within a range of separating heights of the intake from the interface, the degree of selectivity is a quasi-linear function of the separating height. Of special interest is the observation that the defined degree of selectivity approaches unity slowly after passing a critical value of the separating height. The influence of the density difference across the interfacial region is negligible when the intake is close to the density-interface, but increases in importance as the separating height is increased.
W75-04049

SPECIAL FLOOD HAZARD INFORMATION REPORT: YOCKANOOKANY RIVER, DYE DITCH AND MUNSON CREEK, KOSCIUSKO, ATTALA COUNTY, MISSISSIPPI.
Army Engineer District, Mobile, Ala.
Prepared for Mississippi Research and Development Center, May, 1972, 14 p, 4 fig, 3 tab, 9 plates.

Descriptors: *Yockanookany River(Miss), *Dye Ditch(Miss), *Munson Creek(Miss), Kosciusko(Miss), Attala County(Miss).
Identifiers: *Floods, *Flooding, *Flood control, *Flood protection, *Flood plains, Channel improvement, Mississippi.

Yockanookany River, approximately 55 miles long and 9 miles wide, and two of its tributaries, Munson Creek and Dye Ditch, have a total drainage area of 453.5 square miles. Munson Creek enters the river about a mile east of Kosciusko, a diverse agricultural center of 7,000 with a few industries. Dye Ditch flows from the west into the river about one mile south of the city. Timber and agricultural land in the river's flat wide flood plain is slowly beginning to be developed. Little development exists on Munson Creek's flood plain. Along Dye Ditch are a few residences, several commercial and light industrial firms. Flood producing frontal type storms lasting 2 to 4 days are most numerous in winter and spring. Summer thunderstorms with high intensities over small areas cause flash flooding. All three streams are spanned 19 times by bridges and culverts which impede flood flow. Except for earlier canalization projects which contributed silt and debris to overgrown banks, no flood damage reduction project exists and the bankfull stage of 10 feet has been exceeded a number of times. Largest flood, March 29, 1951, crested at 18.72 feet. Most recent flood, May 16, 1968, resulted from flash flooding following 4.2 inches of rain in less than 2 hours and did not cause high flood stages on the river. An Intermediate Regional Flood would be 3 to 4 feet higher than the 1951 flood inundating an estimated 5,500 acres, including residential and commercial sections, roads, and public and private utilities. A Greater Probable Flood (with an average frequency of occurrence of once in 500 years although it may occur in any year) probably inundating about 6,000 acres, would be 6 feet above the 1951 flood. (Salzman-North Carolina)
W75-04204

FLOOD PLAIN INFORMATION: JORDAN RIVER COMPLEX II, MIDVALE-DRAPER, UTAH.
Army Engineer District, Sacramento, Calif.
Prepared for the Utah Division of Water Resources and Salt Lake County, March 1974. 38 p, 17 fig, 8 tab, 28 plates.

Descriptors: *Flood plains, *Flood damage, *Flood forecasting, Flood profiles, Flood data, Obstruction to flow, Land use, Planning, Urbanization, Flood plain zoning, Utah, Dams, Cloudbursts.
Identifiers: *Jordan River(Utah), *Midvale(Utah), Dry Creek(Utah), Willow Creek(Utah), Corner Canyon Creek(Utah), Flood plain management, Standard Project Flood, Intermediate Regional Flood, Wasatch Range, Utah Lake.

This report can serve as a basis to guide land development toward optimum uses commensurate with flood hazard. The 3 creeks, which rise at high elevations in the Wasatch Range and flow westerly to the valley floor and their termini at Jordan River, are intermittent streams and normally flow only during snowmelt season. Although there are a number of urban centers in the study area, Midvale being the largest, the area is not extensively urbanized. Due to the conversion of agricultural land to urban-suburban uses as families migrate from Provo and Salt Lake City to smaller towns, agricultural activities are expected to continue at slightly reduced levels. Floodflows are produced by early season cloudburst storms over tributary drainages and by snowmelt from high temperatures in late May and early June which cause floods with a slow rate of rise and extended out-of-bank period. The most severe flood was of this type in May 1952; a flood this size would have a frequency of occurrence of about once in 50 years. An Intermediate Regional Flood (IRF) on the Jordan River at Jordan Narrows would produce a peak discharge of 1800 cfs and a Standard Project Flood (SPF) at the same point would produce 2200 cfs. In the study area, there are 50 obstructive bridges, culverts, diversion weirs and other stream crossings. There are no flood control structures per se affecting the study reach. However, Utah Lake affords some incidental reduction of flood flows, there is a flood detention dam on Dry Creek, and an ordinance providing for floodway zones is being developed. (Diefendorf-North Carolina)
W75-04205

FLOOD PLAIN INFORMATION: CHOCTAWHATCHEE RIVER, PEA RIVER, DOUBLE BRIDGES CREEK, CITY OF GENEVA, ALABAMA.
Army Engineer District, Mobile, Ala.
June 1973. 28 p, 16 fig, 8 tab, 17 plates.

Descriptors: *Flood forecasting, *Flood control, *Floodplain zoning, *Flood profiles, *Historic floods, *Levees, Flood stages, Flood data, Obstruction to flow, Land use, Planning, Alabama.
Identifiers: *Choctawhatchee River, *Pea River, *Double Bridges Creek, *Geneva(Ala), 'Lincoln Flood', 'Hoover Flood', Standard Project Flood, Intermediate Regional Flood, Floodplain management, Subdivision regulations.

A flood in 1861, called the 'Lincoln Flood', nearly destroyed Geneva and forced it to move from the junction of the Choctawhatchee and Pea Rivers to higher ground, where in 1929 the town was again completely inundated. A levee was built around the town in the 1930's that has protected it up to the present. However, the low-lying unprotected portion of Geneva and the surrounding forest and croplands are subject to flooding from the 3 streams in the study area with water out of banks for several days along the rivers. Flood producing storms occur in all seasons but are more likely to occur in winter and spring. Flood flow is measured by four gaging stations and obstructed by four bridges. The highest flood of record on all three streams known as the 'Hoover Flood' was caused by excessive rainfall in March, 1929. Its elevation was 109.7 ft., m.s.l.d. making it on the order of a Standard Project Flood (SPF). An SPF would crest at 109.8 ft. m.d.l.d. with a peak discharge of 127,000 cfs. and might flood 7,600 acres. An Intermediate Regional Flood (IRF) would be 102.6 ft. with a peak discharge of 77,100 cfs and flood 6,800 acres. To decrease hazards of large floods, drainage pipes, flap valves, and pumping stations are employed to enable the levee to function properly. Geneva has official Land Subdivision Regulations for floodplain development. (Diefendorf-North Carolina)
W75-04212

SENSITIVITY ANALYSIS OF THE OPTIMUM DESIGN FLOOD EVALUATED BY AN OPTIMIZATION PROCEDURE,
Karlsruhe Univ. (West Germany). Theodor-Rehbock Lab. for River Improvement.
E. Mosonyi, W. Kiefer, and W. Buck.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 249-258. 7 fig, 4 ref.

Descriptors: *Flood control, *Flood damage, *Cost-benefit analysis, *Optimization, Flood protection, Cost analysis, Damages, Probability, Levees, Flood profiles, Land use, Flood plains, Design flood.
Identifiers: *Sensitivity analysis, *Black Forest.

The influence of various parameters on the optimum degree of development of flood control measures and flood control levees respectively was investigated. An economic evaluation using cost-benefit analysis was performed for a valley in the Black Forest region. A maximized graph of the mean annual value of net benefit expectancy was used to illustrate that for the selected case the point of optimum was mainly affected by the features of the cost function. Other parameters have less influence in the range of their possible variation. (See also W75-04213) (Terstriep-ISWS)
W75-04234

THE TRIANGLE AS A TENTATIVE UNIT HYDROGRAPH,
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
B. M. Reich, and D. A. Wolf.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 337-349. 8 fig, 1 tab, 24 ref.

Descriptors: *Unit hydrographs, *Hydrographs, *Hydrograph analysis, *Spillways, Streamflow, *Flood control, Storage capacity, Design flood,

*Pennsylvania, Appalachian Mountain Region, Analytical techniques.

Engineers faced with designing flood control schemes or spillways for storage reservoirs seldom have adequate streamflow records from which to obtain inflow hydrographs. This is particularly true for watersheds smaller than 120 square miles in developing countries. An analysis of 69 large flood hydrographs observed on 17 watersheds across the varied geology and landscape of Pennsylvania reaffirmed the triangle as a suitable shape for unit hydrographs. Its form is different from that of the Soil Conservation Service, popularized by the United States Bureau of Reclamation. The ratio of rise-time to baselength, which determines when the unit hydrograph peak occurs, is found to vary within specifiable limits. Ninety percent of the variation in peak rates of discharge for these 1-hour unit hydrographs from watersheds of 4 through 120 square miles can be accounted for by an equation with two predicators. Application to ungaged watersheds could tentatively be extrapolated to many Appalachian states and similar hilly regions of the world with long summer humid continental or east coast continental climates. Mean annual precipitation of the study watersheds ranged from 36 through 50 inches. (See also W75-04213) (Dawes-ISWS)
W75-04239

A DOUBLE-TRIANGLE MODEL FOR GENERATING STORM HYDROGRAPHS,
Tennessee Valley Authority, Knoxville, Tenn. Hydrologic Research and Analysis Office.
C. V. Ardis, Jr.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 350-360. 3 fig, 1 tab, 8 ref.

Descriptors: *Unit hydrographs, *Hydrograph analysis, *Flood peak, *Model studies, Hydrographs, Hydrology, Base flow, Watersheds(Basins), Analytical techniques, Recession curves, Simulation analysis, Precipitation excess, Floods, Streamflow, Duration curves, Rainfall, Tennessee, Equations, Flood control, Storm runoff, Runoff, Appalachian Mountain Region, Southeast U.S., Design flood.
Identifiers: *Double triangle hydrograph, *Ungaged watersheds.

A procedure was developed to compute storm hydrographs at gaged or ungaged sites from rainfall data and watershed characteristics. The procedure uses a unit-response-function model to represent the response of a watershed to a given storm. The watershed unit-response- function is called a double-triangle model. The assumed double-triangle shape is very flexible and allows the model to meet the response shape-characteristics of most storms on many watersheds. Four parameters define the double-triangle model and each is a specific attribute of the model. Significant response variation was found in the parameters within and among watersheds. This response variation was nonlinear and significantly related to storm and watershed characteristics. Nonlinear relationships were developed that relate the double-triangle model parameters to these characteristics. A model for predicting the flood peak directly was also presented. Eleven watersheds and 140 storms constitute the data base. The models were tested on other data and found to be successful. Examples were shown how these models can be used to provide the storm-hydrograph answers needed for regional environmental studies. (See also W75-04213) (Dawes-ISWS)
W75-04241

RUN-OFF REGULATION OF THE ST. LAWRENCE AND ITS LIABILITY,
Bedford Inst., Dartmouth (Nova Scotia).
H. J. A. Neu.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 399-400. 3 ref.

Descriptors: *River regulation, *Runoff, *Environmental effects, *St. Lawrence River, Saline water, Sea water, Freshwater, Mixing, Ecology.

A classical example of runoff regulation is the St. Lawrence system in which large quantities of water from the spring runoff are annually held back in storage lakes and returned to the river during the low discharge period of fall and winter for optimum power production. Freshwater plays a prominent role in the generation of large-scale motions in the estuary, Gulf, and adjacent waters of the Atlantic. It initiates a circulation in which large quantities of seawater are transported from the ocean into the Gulf and up the estuary, a distance of more than 1500 km. The amount of seawater pumped in from the ocean depends on the runoff and on the distance from the sea. Biologists have been inferring that changes in the biological balance and the fluctuations of certain species are related to variations in freshwater runoff. Runoff regulations have imposed large-scale modifications on the ecosystem of the Gulf and of the coastal zone. The complex interdependency existing between the ecological elements of the river and ocean environments makes exact predictions of consequences quite difficult, particularly in the biological field. An assessment of these effects not only qualitatively but also quantitatively, emerges as one of the most urgent problems facing modern science. (See also W75-04213) (Humphreys-ISWS)
W75-04243

RELATIONSHIP BETWEEN LIMNOLOGICAL CONDITIONS OF RESERVOIRS AND WATERSHED FEATURES - A SURVEY,
Ministry of Public Works, Madrid (Spain). Section of Sedimentation and Natural Pollution.
For primary bibliographic entry see Field 2H.
W75-04244

A SET OF REGIME EQUATIONS FOR INDIRECTLY ESTIMATING STREAM FLOW CHARACTERISTICS,
Ohio River Basin Commission, Cincinnati.
For primary bibliographic entry see Field 2E.
W75-04245

THE APPROXIMATE PROBABILITY DENSITY FUNCTION OF RANGE AND ADJUSTED RANGE,
National Energy Authority, Bangkok (Thailand).
For primary bibliographic entry see Field 6A.
W75-04246

WATER QUALITY ASPECTS OF THE 1973 OPENING OF THE MISSISSIPPI RIVER DIVERSION SPILLWAY AT BONNET CARRE, LOUISIANA, U.S.A.,
Army Engineer District, New Orleans, La.
For primary bibliographic entry see Field 5B.
W75-04256

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING, THE CLARION RIVER BASIN, PENNSYLVANIA.
Federal Power Commission, Washington, D.C. Bureau of Power.
For primary bibliographic entry see Field 6G.
W75-04274

CRE: A METHOD FOR SOLVING PROBABILITY PROBLEMS RELATED TO HYDROLOGIC TIME SERIES,
Idrotecneco, San Lorenzo in Campo, (Italy).
For primary bibliographic entry see Field 2E.
W75-04310

THE MEASUREMENT OF IMPACTS IN SMALL WATERSHEDS FOR FLOOD CONTROL,
New South Wales Inst. of Technology, Kensington (Australia). Dept. of Economics.
P. A. R. Maxwell, and R. M. North.
Water Resources Bulletin, Vol 10, No 6, p 1277-1287, December 1974. 1 fig, 4 tab, 9 ref.

Descriptors: *Economic impact, *Economic justification, *Cost-benefit analysis, Cost-benefit theory, *Benefits, *Flood control, Land use, Watersheds(Basins), Watershed Protect. and Flood Prev. Act, Measurement, Land appraisals, *Small watersheds, Evaluation.

An analogue method of ex post evaluation was proposed as a method of measuring the effectiveness of small watershed projects in obtaining flood control and economic benefits. Two watersheds were compared on a 'with versus without' project basis by both direct and indirect measurement of economic benefits. Direct measurements indicated that small watershed flood control projects did not generate the expected economic benefits. Indirect meaaurements of the same watersheds using land value enhancement as a surrogate suggested that the expected economic benefits were reflected in differential land values. It was concluded that the economic efficiency of small watershed projects should be measured ex ante and ex post on a 'with versus without' project basis rather than on a 'before versus after' basis either with direct or surrogate variables. (Terstriep-ISWS)
W75-04341

THE UNIT HYDROGRAPH: A SATISFACTORY MODEL OF WATERSHED RESPONSE,
Massey Univ., Palmerston North (New Zealand). Dept. of Geography.
For primary bibliographic entry see Field 2A.
W75-04344

RESERVOIR OPERATION THROUGH OBJECTIVE TRADE-OFFS,
Iowa Univ., Iowa City. Inst. of Hydraulic Research.
T. E. Croley, II.
Water Resources Bulletin, Vol 10, No 6, p 1123-1132, December 1974. 4 fig, 31 ref.

Descriptors: *Optimum development plans, *Multiple-purpose projects, *Assessments, Planning, *Reservoir operation, Water resources development, Flood control, Value engineering, Recreation, Analytical techniques, Decision making, Management, Design, *Comprehensive planning.
Identifiers: *Multi-objective design, Objective trade-offs, *Impact evaluation design.

Water resources project developments have progressed from strictly engineering designs through economic-engineering designs to the present, all-inclusive, impact evaluation designs. The introduction of human factor objectives complicates the problem because they are noncommensurate with other objectives and they are difficult to identify quantitatively. Some of the problems that now arise concern the proper methods for consideration of several different, sometimes subjectively identified, objectives in reservoir planning. The classical systems analysis approach to decision making for multiple objective problems was outlined and the inherent difficulties associated with multiple objectives and subjective estimates were identified. Techniques being used in reservoir design and operation were reviewed and discussed. An alternate technique for con-

sidering noncommensurate, subjectively identified, objectives, which relates the objectives in terms of real trade-off costs and eliminates the need for a priori estimates of objective worth, was presented. The method was illustrated with three examples, including a reservoir operation problem and a cooling tower design problem. (Singh-ISWS)
W75-04345

4B. Groundwater Management

INTEGRATED SYSTEM IDENTIFICATION AND OPTIMIZATION FOR CONJUNCTIVE USE OF GROUND AND SURFACE WATER, PHASE II,
Case Western Reserve Univ., Cleveland, Ohio. Dept. of Systems Engineering.
Y. Y. Haimes.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-238 891, $5.25 in paper copy, $2.25 in microfiche. Completion Report 45IX, Ohio Water Resources Center, Columbus, (SED-WRG-74-1), September 1974. 106 p, 8 fig, 15 tab, 20 ref, 2 append. OWRT B-050-OHIO(1).

Descriptors: *Groundwater management, Surface waters, *Conjunctive use, *Aquifers, Drawdown, *Transmissivity, Recharge, *Optimization, Planning, *Water management(Applied), *Ohio, Model studies, *Storage, Pumping.
Identifiers: Fairfield Aquifer(Ohio), Miami Conservancy District(Ohio), Algebraic technological functions, Parameter identification, Hierarchical modeling.

The groundwater parameter identification model developed in Phase I has been further modified and improved as part of Phase II work. A hierarchical management model was developed and tested. The coupling of a complex multicell aquifer system was studied via an extension of the algebraic technological function approach. Functions were developed to relate the infiltration from a stream into an aquifer due to pumpage at a well . A new approach was proposed to incorporate time varying boundary conditions in a groundwater system. A predictive model was developed to demonstrate the usefulness of these response oriented models, where the decision variables include pumpage, artificial recharge, and imported water. A model for the planning and management of a groundwater system was developed, incorporating a tax-quota system. The research results were applied to the area of the lower Great Miami River with data provided by the Miami Conservancy Dist. (MCD), Dayton, Ohio. (See also W75-03201)
W75-03853

THE OBSERVATION-WELL NETWORK OF THE U.S. GEOLOGICAL SURVEY IN FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 7C.
W75-03971

POSSIBLE DEVELOPMENT OF WATER FROM MADISON GROUP AND ASSOCIATED ROCK IN POWDER RIVER BASIN, MONTANA-WYOMING,
Geological Survey, Denver, Colo.
F. A. Swenson.
Report for the Northern Great Plains Resources Program, July 1, 1974. 6 p, 4 plate.

Descriptors: *Groundwater, *Water supply, *Montana, *Industrial water, Hydrogeology, Basic data collections, Aquifers, Water yield, Water quality, *Wyoming.
Identifiers: *Powder River basin(Mont).

The potential for developing large groundwater supplies for industrial use in the Powder River basin of Wyoming and Montana is summarized. Records of many oil tests and several water wells indicate that the Madison Group and the underlying carbonate rocks are hydrologically connected and transmit water as a unit. Also, in many localities, the overlying Tensleep and Minnelusa sandstones are also connected with the Madison. These rocks underlie the entire basin and are exposed on the flanks of the surrounding mountains. The Madison rocks, and to a considerable extent the underlying carbonates, are fractured and cavernous. Large quantities of water have been derived from these rocks in the Midwest, Wyoming area since 1917. The Madison and underlying carbonates contain water of moderate-to-good quality that is probably suitable for industrial use. It contains too high a percentage of sodium for irrigation use. (Knapp-USGS)
W75-03972

GEOHYDROLOGIC MAP OF SOUTHERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 7C.
W75-03973

HYDROLOGIC DATA FOR 1973, BROWARD COUNTY, FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 3B.
W75-03976

WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN THE NORTHERN GREAT PLAINS COAL REGION OF EASTERN MONTANA, 1974-75.
Geological Survey, Helena, Mont.
For primary bibliographic entry see Field 7C.
W75-03977

WATER-RESOURCES DATA COLLECTED IN THE DEVILS HOLE AREA, NEVADA, 1973-74,
Geological Survey, Las Vegas, Nev.
For primary bibliographic entry see Field 7C.
W75-03978

QUALITY AND AVAILABILITY OF WATER IN WESTERNMOST TEXAS,
Geological Survey, El Paso, Tex.
For primary bibliographic entry see Field 2K.
W75-03979

SPECIAL TECHNIQUES FOR DETERMINING CHEMICAL PROPERTIES OF GEOTHERMAL WATER,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2K.
W75-03980

USE OF WATER IN GEORGIA, 1970, WITH PROJECTIONS TO 1990,
Geological Survey, Atlanta, Ga.
For primary bibliographic entry see Field 6D.
W75-03983

GEOLOGY AND GROUND-WATER RESOURCES OF GORDON, WHITFIELD, AND MURRAY COUNTIES, GEORGIA,
Geological Survey, Atlanta, Ga.
For primary bibliographic entry see Field 2F.
W75-03984

GEOHYDROLOGY OF NEMAHA COUNTY, NORTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
For primary bibliographic entry see Field 2F.
W75-03986

GEOLOGY AND GROUND-WATER RESOURCES OF MONTGOMERY COUNTY, SOUTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
For primary bibliographic entry see Field 2F.
W75-03987

SOLID WASTE AND WATER QUALITY, (LITERATURE REVIEW),
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
For primary bibliographic entry see Field 5B.
W75-04016

SOLID WASTE DISPOSAL BY LAND BURIAL IN SOUTHERN INDIANA,
Indiana Univ., Bloomington.
For primary bibliographic entry see Field 5B.
W75-04035

WATER RESOURCES EVALUATION OF THE SOUTHERN HIGH PLAINS OF NEW MEXICO,
New Mexico State Univ., University Park. Dept. of Agricultural Economics.
R. R. Lansford, W. Brutsaert, B. J. Creel, A. Flores, and W. Loo.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 230, $4.25 in paper copy, $2.25 in microfiche. New Mexico Water Resources Research Institute, Las Cruces, Report 044, July 1974. 59 p, 8 fig, 22 tab, 54 ref. OWRT B-037-NMEX(1).

Descriptors: *New Mexico, *Water demand, *Water resources development, Management, *Economic prediction, Natural resources, Water requirements, Resource allocation, Groundwater, Water quality, Water utilization, Human population, Employment, Linear programming, *Evaluation, Water management(Applied), *Model studies.
Identifiers: *High Plains(N Mex), *Socioeconomic models, Input-output coefficients, Hydrogeology, Groundwater appropriation.

An interdisciplinary approach to the solution of the water resource problems of the Southern High Plains in New Mexico was made possible by the integration of hydrology and geology with economics. Research procedures developed to carry out this study were closely coordinated by the investigators to achieve the primary objective of evaluation of the social and economic impacts of alternative water-use policies. A linear programming model was developed to represent the Southern High Plains economy. Inputs into the model were obtained from separate studies covering the hydrological, agricultural, municipal, and industrial areas. Three sets of alternatives were considered: (1) growth without a water constraint; (2) growth, decreasing pumpage 10 percent after 1966; (3) growth, increasing pumpage 10 percent after 1966. Without a water constraint, both production and depletions are expected to exhibit the largest increase (54.5 percent and 66.9 percent, respectively). When a 10 percent decrease in pumpage constraint is imposed in the year 2020, the value of production is reduced by $19.02 million; employment by 2931 employees; and water depletions decreased about 62 percent. When a 10 percent increase in pumpage constraint is imposed, the value of production is decreased $47.09 million below that expected when compared to a 10 percent decrease in pumpage, and water depletions are reduced only slightly (31,900 acre-feet). (Hain-New Mexico State)
W75-04042

THE ATMOSPHERIC FORMATION OF SECONDARY AEROSOLS DURING VENTILATED UNDERGROUND NUCLEAR TESTS,
For primary bibliographic entry see Field 5B.
W75-04069

UTILIZATION OF MINERAL AND THERMAL SPRINGS IN IRAQ: PRELIMINARY REPORT.
Institute for Applied Research on Natural Resources, Baghdad (Iraq).
Scientific Research Foundation, Ministry of Higher Education and Scientific Research, Baghdad, Iraq. Technical Bulletin 58, March, 1974. 165 p, 10 fig, 15 tab, 4 ref.

Descriptors: *Springs, *Spring water, *Hydrogeology, *Thermal springs, *Potable water, Bacteria, Mineral water, Climatology, Climatic data, Climatic zones, Meteorological data, Seepage, Artesian wells.
Identifiers: *Iraq.

A preliminary survey of springs in Iraq was conducted to determine the development potential of this previously neglected resource. In all, 166 springs were located, mapped and classified into four categories: ordinary, mineral, thermal, and drinking water. The classification was based on hydrogeological, hydrochemical, bacteriological, and balneological characteristics of the springs. Of the springs surveyed, seven of the most promising have been considered; and three of these have specific recommendations for immediate development. A need exists for additional information on some of the located springs as well as plans for their development. A more complete survey to locate additional springs is also suggested. (Mastic-Arizona)
W75-04140

METHODS FOR ESTIMATING TRANSPORT MODEL PARAMETERS FOR REGIONAL GROUNDWATER SYSTEMS,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
For primary bibliographic entry see Field 2F.
W75-04271

IDENTIFICATION OF A DISTRIBUTED PARAMETER SYSTEM IN HYDROLOGY,
California Univ., Berkeley. Operations Research Center.
For primary bibliographic entry see Field 2F.
W75-04280

SECOND-ORDER THEORY OF FLOW IN THREE-DIMENSIONAL DEFORMING MEDIA,
Centro di Ricerca IBM di Venezia (Italy).
For primary bibliographic entry see Field 2F.
W75-04308

THE SHAPE OF THE INTERFACE IN STEADY FLOW IN A STRATIFIED AQUIFER,
Technion - Israel Inst. of Tech., Haifa (Israel). Dept. of Civil Engineering.
For primary bibliographic entry see Field 2F.
W75-04329

RISE AND DECLINE OF THE WATER TABLE INDUCED BY VERTICAL RECHARGE,
California Univ., Davis.
For primary bibliographic entry see Field 2F.
W75-04333

GROUNDWATER STORAGE-RIVERFLOW RELATIONS IN A CHALK CATCHMENT,
Institute of Geological Sciences, London (England). Dept. of Hydrogeology.
For primary bibliographic entry see Field 2A.
W75-04339

MODELS OF DISPERSION IN A GRANULAR MEDIUM,
California Univ., Davis.
For primary bibliographic entry see Field 2F.
W75-04340

4C. Effects On Water Of Man'S Non-Water Activities

THE BIOCHEMICAL OXYGEN DEMAND OF FINELY DIVIDED LOGGING DEBRIS IN STREAM WATER,
Oregon State Univ., Corvallis.
For primary bibliographic entry see Field 5C.
W75-03913

SHALLOW GROUND WATER IN SELECTED AREAS IN THE FORT UNION COAL REGION.
Geological Survey, Helena, Mont.
For primary bibliographic entry see Field 5B.
W75-03974

DETERMINING LAND USE CHANGES IN WATERSHEDS BY AERIAL PHOTOGRAPHIC MEASUREMENTS,
Clemson Univ., S. C. Dept. of Civil Engineering.
M. E. Nettles, and D. B. Stafford.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 192, $4.25 paper copy $2.25 microfiche. South Carolina Water Resources Research Institute, Clemson, Report No. 47, June 1974. 55 p, 8 fig, 3 tab, 28 ref. Partial Completion Report. OWRT A-024-SC(4). 14-01-0001-4041.

Descriptors: *Urbanization, *Land use, *Aerial photography, *Remote sensing, *Photogrammetry, Hydrology, *South Carolina, Agricultural watersheds, Watersheds(Basins).
Identifiers: *Reedy River(SC), *North Tyger River(SC), Urban watersheds.

Techniques are described for using aerial photographs to investigate land use changes in watersheds. Land use changes in two watersheds in western South Carolina were examined. The North Tyger River watershed near Spartanburg, South Carolina, has experienced significant changes in agricultural land use over the past 26 years. The Reedy River watershed, within which most of the city of Greenville, South Carolina, is located, has experienced rapid urbanization over the past 27 years. Six sets of existing aerial photographs taken at approximately five-year intervals were used to delineate, classify, code, and measure the areas of various land use classes in the two watersheds. The land use classes employed were those that had different runoff characteristics. The area occupied by each land use class was measured on scaled photographic enlargements by using a planimeter. Significant changes in land use were observed in the two watersheds over the study period. The results indicate that the use of aerial photographs to obtain data on the historical distribution of land use in watersheds represents a satisfactory approach that could be used more widely.
W75-04051

MORE STREAMFLOW AFTER A BARK BEETLE EPIDEMIC,
Forest Service (USDA), Ogden, Utah. Intermountain Forest and Range Experiment Station.
N. Bethlahmy.
Journal of Hydrology, Vol 23, No 3/4, p 185-189, 1974. 1 fig, 2 tab, 5 ref.

Descriptors: *Forest watersheds, Epidemics, Bark, Water beetles, *Streamflow, Water yield, Water injury, *Water loss, Water shortage, *Watersheds(Basins), *Plant diseases, *Colorado.
Identifiers: *Beetle-infested watersheds, Continental Divide(Colo), White River watershed(Colo), Elk River watershed(Colo), Yampa River watershed(Colo).

A bark beetle epidemic near the Continental Divide in Colorado destroyed the timber in two large drainages but bypassed a third drainage. The base period for this analysis was from 1911 to 1940, when the beetle population was at an epidemic level. The epidemic started in 1941 in the White River drainage, gradually advanced north and east into the Yampa River watershed, but failed to become established in the Elk River watershed where tree mortality was minor. The control was in the Elk watershed. Analysis of data revealed that major increases in streamflow occurred after the epidemic. Average annual increases in streamflow for the White and Yampa Rivers were shown for the 24-year period 1941-1965. The smallest increases occurred during the first 5-year period, when the beetle population was multiplying to epidemic proportions; the largest increases occurred 15 years later in the 1956-1960 period. (Roberts-ISWS)
W75-04342

4D. Watershed Protection

PROTECTING CREEKSHEDS: DEVELOPMENT AND EVALUATION OF A METHOD TO MANAGE SMALL, URBANIZING WATERSHEDS THROUGH LOCAL GOVERNMENT ACTIONS,
Huron River Watershed Council, Ann Arbor, Mich.
E. W. Say, and A. J. Dines.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 139, $7.50 in paper copy, $2.25 in microfiche. Completion Report, December 1974. 223 p. OWRT C-5278 (4219)(1).

Descriptors: Information exchange, *Planning, *Small watersheds, *Water management(Applied), *Local governments, *Urbanization, *Land use, Runoff, Open channels, Drainage systems, Michigan, Social aspects, Competing uses, Governments, Legal aspects, Zoning, Multiple use, Sediment control, Storm runoff, Wildlife conservation, Streamflow, Nonstructural alternatives, Erosion control.
Identifiers: Citizen participation, Creek corridor, Development control, Townships, Open space.

The research focused on small, urbanizing watersheds and the impacts of land use decisions on the benefits provided by the stream. The primary objective was to develop and test one method hypothesized as being effective in stimulating interest in local water resources management through land use controls among local units of government and property owners. Three small watersheds were chosen and local officials, property owners and agencies in each were involved in an intensive information exchange and dissemination effort using a number of modes of communication. Information about the streams was sought in three phases (creek benefits, creek problems, alternative management techniques) and the data provided permitted the development (and subsequent community evaluation of) of a specialized creekshed protection program. The participants regarded the information supplied as useful and appropriate. The elements of the protection programs (avoiding soil erosion/sedimentation, regulating the change in runoff characteristics and protecting the creek corridor) were viewed as most likely to be implemented in the creeksheds experiencing the greatest urbanization pressure. The approach developed is simple, can be done within the existing institutional framework and uses information generally available. Local governmental units in urbanizing areas can protect water courses through land use regulations and controls. (See also W75-03745)
W75-03947

PROTECTING CREEKSHEDS, ANALYSIS AND ACTION,
Huron River Watershed Council, Ann Arbor, Mich.

E. W. Say, and A. J. Dines.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 140, $3.75 in paper copy, $2.25 in microfiche. (1974). 24 p, 16 fig, 2 tab, 26 ref. OWRT C-5278(No 4219)(1).

Descriptors: *Small watersheds, *Water management(Applied), Cities, Urbanization, Land use, *Information exchange, Planning, Local governments, *Social participation.
Identifiers: *Creeksheds, *Citizen participation.

This booklet was written to provide basic information about creeksheds for those in urbanizing areas; why they are important, how they are adversely affected by urbanization and what can be done to protect creek benefits and avoid problems. It presents only the most essential information relating to small watersheds and their management. It is intended as a non-technical publication for those with an interest in protecting creeks but without experience in water resource problems. It is hoped that the booklet will serve as a source book for information and as a guide for action. The experience on which it is based is from the Great Lakes region and from Southeast Michigan in particular. However, the conditions, issues, and problems found in many other parts of the country are very similar. The management approaches suggested here for creekshed protection and improvement will therefore have many applications elsewhere.(See also W75-03947)
W75-03948

VEGETATION MANAGEMENT FOR INCREASED WATER YIELD IN ARIZONA,
Arizona Univ., Tucson. Dept. of Watershed Management.
For primary bibliographic entry see Field 3B.
W75-03961

THE NONLINEAR RAINFALL RESPONSE OF WATERSHEDS WITH TIME DEPENDENT STORAGE AND CONVEYANCE PROPERTIES,
Cincinnati Univ., Ohio. Dept. of Engineering Analysis.
For primary bibliographic entry see Field 2A.
W75-04240

THE MEASUREMENT OF IMPACTS IN SMALL WATERSHEDS FOR FLOOD CONTROL,
New South Wales Inst. of Technology, Kensington (Australia). Dept. of Economics.
For primary bibliographic entry see Field 4A.
W75-04341

MORE STREAMFLOW AFTER A BARK BEETLE EPIDEMIC,
Forest Service (USDA), Ogden, Utah. Intermountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 4C.
W75-04342

THE UNIT HYDROGRAPH: A SATISFACTORY MODEL OF WATERSHED RESPONSE,
Massey Univ., Palmerston North (New Zealand). Dept. of Geography.
For primary bibliographic entry see Field 2A.
W75-04344

EFFECT OF NITRATE AND SEDIMENT CONSTRAINTS ON ECONOMICALLY OPTIMAL CLAY PRODUCTION,
Illinois Univ., Urbana. Agricultural Experimental Station.
H. Onishi, and E. R. Swanson.
Journal of Environmental Quality, Vol 3, No 3, p 234-238, July-September, 1974. 2 fig, 1 tab, 12 ref. OWRT B-049-ILL(6). 14-31-0001-3272.

Descriptors: *Nitrates, *Sediments, *Soil conservation, Linear programming, *Optimization, *Crop production, Erosion, Watershed management, Root zone, *Leachate, Clays.
Identifiers: Optimal crop production, Conservation village, Nitrogen application rate.

Crop systems and practices that are economically optimal in a 485.6-ha watershed with a planned reservoir were ascertained under conditions of differing constraints on water quality in the reservoir. Linear programming was the technique employed. Consideration was taken of two requirements related to sedimentation and three requirements related to NO3-N concentration in the leachate below the root zone. Six combinations of restrictions on the choice of optimal crop systems were fulfilled. For all sediment introduced into the reservoir a system of charges reduced erosion, irrespective of the limit put on NO3-N concentration in the leachate below the root zone. Relaxation of the limit of NO3-N from 10 mg/liter to no limit doubled the net income above nonland costs. (Leibowitz-FIRL)
W75-04349

5. WATER QUALITY MANAGEMENT AND PROTECTION

5A. Identification Of Pollutants

APPARATUS FOR DETERMINING ORGANIC CARBON CONTENT OF POLLUTED LIQUIDS,
A. Cohen.
US Patent No 3,854,881, 4 p, 3 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 1137, December 17, 1974.

Descriptors: *Patents, Water pollution control, Pollution abatement, *Waste water treatment, Oxydation, Equipment, Measurement, Carbon, Carbon dioxide, *Pollutant identification.
Identifiers: *Acidification, *Organic carbon, *Infrared analyzers.

A sample stream, from the aqueous liquid source to be monitored, is continuously fed into a mixing chamber together with sufficient acid to react with and remove as carbon dioxide all of the inorganic carbon content of the sample, i.e. the carbonates in the sample. The acidified sample is scrubbed to remove all carbon dioxide produced by the carbonate-acid reaction, and the carbonate-free sample is metered into a reaction chamber. The reaction chamber has an inlet through which the sample and air for oxidizing the organic carbon are introduced; an outlet for the exit of gaseous and vapor products formed from the sample; and a granular packing material inside that is heated by electric resistor elements placed outside the chamber. The packing material is chemically inert, such as crushed quartz, and is heated to a temperature at which the organic carbon in the sample is oxidized to carbon dioxide by the air atmosphere in the chamber. Carbonaceous matter in the sample is quickly oxidized by the hot air atmosphere so that the effluent therefrom is a mixture of water vapor and other gaseous products including carbon dioxide. The amount of carbon dioxide corresponds to the amount of organic carbon originally present in the sample. The water vapor portion of the reaction chamber effluent is removed by a conventional gas-liquid separator before delivery to an infrared analyzer for measurement of the carbon dioxide component. (Sinha-OEIS)
W75-03861

CONTROL METHODS FOR WASTE WATERS AND SOLUTIONS OF SPECIFIC SUBSTANCES (METODI DI CONTROLLO DI ACQUE DI SCARICO E SOLUZIONI DI SOSTANZE SPECIFICHE),
Stazione Sperimentale per la Cellulosa, Carta e Fibre Tessili Vegetali ed Artificiali, Milano (Italy).
For primary bibliographic entry see Field 5B.
W75-03885

ULTRAVIOLET SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF LIGNIN IN EFFLUENTS (UF-SPEKTROFOTOMETRICHESKII METOD OPREDELENIYA LIGNINA V STOCKNYKH VODAKH),
Vsesoyuznyi Nauchnyi-Issledovatelskii Institut Bumagi, Arkhangelsk (USSR).
A. A. Sokolova, L. A. Semakova, and D. P. Moseeva.
Bumazhnaya Promyshlennost', No 8, p 21-22, August, 1974. 1 fig, 3 tab, 3 ref.

Descriptors: *Pulp wastes, *Lignins, *Pollutant identification, *Sprectoscopy, *Ultraviolet radiation, Analytical techniques, Laboratory tests, Chemical analysis, Organic wastes, Wastes, Water pollution sources, Industrial wastes, Water quality control, Softwood, Coagulation, Separation techniques, Potassium compounds, Iron compounds, Polyelectrolytes, Flocculation, Monitoring.
Identifiers: Potassium alum, Aluminum sulfate, Aluminum compounds, Polyacrylamide, Black liquors(Spent kraft pulping liquors).

The suitability of the UV spectroscopic method for the determination of the effectiveness of lignin removal from pulp mill effluents was investigated. The experiments were conducted on a model solution, i.e., a 1:200 dilution of black liquor from laboratory cooks of sprucewood. Samples of the solution were coagulated with potassium alum, aluminum sulfate, ferric chloride, ferric sulfate, or ferrous sulfate. Determinations were made of oxidizability, COD, and lignin content of the filtrates, the latter by measurements of absorption at 280 nm and using a calibration curve. The best effect, i.e., the removal of 71% lignin, was obtained with 75 mg/liter of potassium alum. Aluminum sulfate gave 68.4% removal. Other coagulants gave lower degrees of purification. About 30% lignin remains in the form of low molecular weight degradation products. The results of additional experiments in which the coagulants were used simultaneously with polyacrylamide as a flocculant (20-200 mg/liter) showed that polyacrylamide does not interfere with the spectrometric determination of lignin. (Stapinski-IPC)
W75-03897

THE DETERMINATION OF MERCURY IN WATER SAMPLES FROM THE ENVIRONMENT BY NEUTRON ACTIVATION ANALYSIS,
Reactor Centrum Nederland, Petten.
H. A. Van der Sloot, and H. A. Das.
Analytica Chimica Acta, Vol 73, No 2, p 235-244, December, 1974. 6 fig, 2 tab, 13 ref.

Descriptors: *Mercury, *Neutron activation analysis, *Water analysis, Surface waters, Analytical techniques, Chemical analysis, Suspended solids, Metals, Water pollution sources, Water pollution, *Pollutant identification, Organic compounds, Inorganic compounds, Heavy metals.

A sensitive method for the determination of Hg in sea and surface waters is described. A distinction is made between inorganic, organic, and particulate Hg. In the determination of inorganic Hg, the element is isolated by reduction and volatilization, followed by absorption on a charcoal column. The total Hg content of the water with and without suspended solids is determined by absorption from the solution onto a column of charcoal. In all cases, the Hg on the absorber is determined by thermal neutron activation analysis. The limit of detection is 1 nanogram/liter. (Witt-IPC)
W75-03908

DIRECT ANALYSIS OF WATER SAMPLES FOR ORGANIC POLLUTANTS WITH GAS CHROMATOGRAPHY/MASS SPECTROMETRY,
Environmental Protection Agency, Cincinnati, Ohio.
L. E. Harris, W. L. Budde, and J. W. Eichelberger.
Analytical Chemistry, Vol 46, No 13, p 1912-1917, November, 1974. 4 fig, 2 tab, 9 ref.

Descriptors: *Organic compounds, *Water analysis, *Gas chromatography, *Mass spectrometry, *Pollutant identification, Analytical techniques, Water pollution sources, Waste identification, Water properties, Organic wastes, Chemicals, Chemical wastes.

A direct aqueous injection gas chromatography/mass spectrometry (GC/MS) procedure was explored as a supplement to conventional solvent extraction for the analysis of organic pollutants in water and waste water samples. Studies were made of the effects of relatively large pressures of water vapor on the well established electron impact fragmentation patterns, quadrupole GC/MS system performance, interaction background subtraction, and detection limits. Relatively large pressures of water vapor in the mass spectrometer had no significant effect on the impact fragmentation patterns of organic compounds or the performance of the GC/MS system. The detection limits attained by conventional data acquisition were 1-50 ppm. With real time data acquisition from subsets of the ions used in conventional mass spectrometry, the sensitivity was 50 ppb. (Witt-IPC)
W75-03910

A HIGHLY SENSITIVE TECHNIQUE FOR THE LIQUID CHROMATOGRAPHIC ANALYSIS OF PHENOLS AND OTHER ENVIRONMENTAL POLLUTANTS,
Canada Centre for Inland Waters, Burlington (Ontario).
A. A. Wolkoff, and R. H. Larose.
Journal of Chromatography, Vol 99, p 731-743, November 6, 1974. 7 fig, 4 tab, 33 ref.

Descriptors: *Phenols, *Water analysis, *Chromatography, *Pollutant identification, Analytical techniques, Organic compounds, Aromatic compounds, Water pollution sources, Water properties, Fluorescence, Spectroscopy.
Identifiers: Cerium compounds.

A highly sensitive technique is described for the analysis of phenols and other environmental pollutants in water by liquid chromatography. The system utilizes a reaction detector whereby cerium(IV) sulfate is reacted with phenols in the column effluent, and the cerium(III) thus produced is detected by fluorescence spectroscopy. The detector shows good linearity in the region 10-230 ppb of phenol. When combined with suitable concentration techniques, the lower limit of detection of phenols in environmental samples is about 0.4 ppb. (Witt-IPC)
W75-03911

MONITOR FOR THE QUALITY OF AUSTRALIA'S WATER RESOURCES,
Commonwealth Scientific and Industrial Research Organization, Clayton (Australia). Div. of Chemical Physics.
G. F. Box.
Australian Science and Technology, Vol 12, No 3, p 14-15, October-November, 1974. 2 fig.

Descriptors: *Electrical conductance, *Monitoring, *Water quality, *Dissolved solids, Surface waters, Measurement, Instrumentation, Logging(Recording), Salinity, Water pollution, *Australia, *Pollutant identification.

A compact rugged instrument has been designed to record at 12-hourly intervals the total dissolved solids content of surface waters in the range 100 to 10,000 ppm with accuracy of the order of plus or minus 5% of the full range. The conductivity of the solution under test is measured by an inductive sensing head, and the resulting signal is evaluated by a successive-approximation measuring circuit. The instrument is battery-powered and capable of operating unattended for at least three months. It may be produced either in a totally-immersed self-contained form, or as a land-based recording unit connected by cable to the immersed sensing head; in the latter case it can be interfaced to a wide range or recording equipment currently used in Australia. (Levick-CSIRO)
W75-03939

THE PROCESSING AND STORAGE OF WATER-QUALITY DATA IN THE NATIONAL WATER DATA STORAGE AND RETRIEVAL SYSTEM,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-03970

DETECTION OF WATER POLLUTANTS BY A CO2 LASER,
Technische Universitaet, Munich (West Germany). Physikdepartment.
G. Kraus, M. Maier, and N. Kaiser.
Optics Communications, Vol 11, No 2, p 175-177, June, 1974. 1 fig, 5 ref.

Descriptors: *Water pollution, *Lasers, *Infrared radiation, *Absorption, *Spectroscopy, Industrial pollution, Sewage, Lakes, Rivers, Carbon dioxide, Sulfates, Ions.
Identifiers: Inorganic anions, Absorption bands, Vibrational and rotational absorption bands.

The concentration of SO4 ions in the sewage of a textile plant was measured by the infra-red absorption of a cw CO2 laser. The detection sensitivity was determined at about 50 mg/liter. Infra-red absorption spectroscopy is an effective technique in the detection of small concentrations of organic and inorganic molecules. The molecules' vibrational and rotational absorption bands are the identifying factors. Spectroscopic techniques have lately been used for the quantitative measurement of air pollutants' concentration. In dealing with water pollution, many common inorganic anions exhibit characteristic absorption bands in the wavelength region between 6 and 11 micrometers. The major difficulties in measuring the concentration of pollutants dissolved in water are: that pure water has a high absorption in the infra-red region; and that the concentration of the pollutants is generally very small, ranging from 1 mg/liter or less in clean lakes and rivers to about 1000 mg/liter in the sewage of industrial plants. These concentrations are not measurable with conventional infra-red light sources and spectrometers where detection of several g/liter is achieved. A cw CO2 laser in conjunction with a sensitive two-beam method resolves the difficulty. (Leibowitz-FIRL)
W75-04012

DETERMINATION OF PARTS PER BILLION SULFIDE IN WATER WITH THE SULFIDE-SELECTIVE ELECTRODE,
Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.
E. Baumann.
Analytical Chemistry, Vol 46, No 9, p 1345-1347, August, 1974. 1 fig, 2 tab, 5 ref.

Descriptors: *Sulfides, *Water pollution, *Electrodes, Chemical wastes, Heavy metals, Potentiometric levels, *Pollutant identification.
Identifiers: *Sulfide-selective electrode, Sodium salicylate, Dithizone extraction, Ascorbic acid, Alkaline EDTA.

The sulfide-selective electrode is helpful in the routine determination of total sulfide in water due to the simplicity of measurement and absence of interferences. A procedure developed by Orion Research Incorporated, with a sulfide antitoxicant buffer of sodium salicylate, ascorbic acid, and sodium hydroxide, determines sulfide contents as low as 0.1 ppm. This sensitivity was extended to 30 ppb by the removal of heavy metals from the sodium salicylate by dithizone extraction. A preconcentration step was incorporated in the process, extending the determination to a lower ppb range. The sulfide was separated as ZnS, coprecipitated with Zn(OH)2, and dissolved in alkaline EDTA-ascorbic acid solution for potentiometric measurement with the sulfide-selective electrode. Higher concentrations of sulfide were determined without the preconcentration step. (Leibowitz-FIRL)
W75-04021

THE COMPARATIVE MARINE GEOCHEMISTRIES OF LEAD 210 AND RADIUM 226,
Scripps Institution of Oceanography, La Jolla, Calif.
For primary bibliographic entry see Field 5B.
W75-04029

CHARACTERIZATION AND DEWATERABILITY OF WATER TREATMENT PLANT RESIDUES,
Missouri Univ., Columbia. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5D.
W75-04039

ACCUMULATION OF MERCURY BY FISH AND TURTLES OF THE LITTLE PINEY RIVER,
Missouri Univ., Rolla. Dept. of Chemistry.
G. L. Bertrand.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 253, $3.25 in paper copy, $2.25 in microfiche. Missouri Water Resources Research Center, Columbia, Completion Report, (1974). 5 p, 1 fig. OWRT A-067-MO(1).

Descriptors: *Mercury, Fish, *Turtles, Aquatic animals, *Trout, *Missouri, Fungicides, Analytical techniques, *Pollutant identification, Water pollution effects.
Identifiers: *Atomic absorption.

Trout that had been continuously frozen since they were taken from Missouri streams in the 1946-50 period were analysed for mercury. These analyses (flameless atomic absorption) were compared with those of the same species collected recently from the same streams. The older fish had a much higher mercury content (about 3 ppm mercury). Mercury content of trout and turtles caught in 1974 ranged from 0.2 to 0.4 ppm. Two explanations are suggested for the higher mercury content of the older fish; (a) Fungicides, containing mercury, formerly added as seed treatments are no longer used, and (b) most of the older fish were raised under natural conditions, while most current catches are now raised in hatcheries and regularly released in the streams.
W75-04040

NUCLEAR METEOROLOGY,
Hydrometeorological Service of the USSR, Moscow.
For primary bibliographic entry see Field 5B.
W75-04054

VERTICAL DISTRIBUTION OF RADIOACTIVE AEROSOLS IN THE TROPOSPHERE OVER THE EUROPEAN USSR IN 1964-1967,
For primary bibliographic entry see Field 5B.
W75-04055

DISTRIBUTION OF FISSION PRODUCTS OVER OCEANS IN THE TROPICAL ZONE AND THEIR RELATION TO ATMOSPHERIC PROCESSES,
For primary bibliographic entry see Field 5B.
W75-04056

DETERMINATION OF RADIOISOTOPE FALLOUT FROM ITS CONTENT IN CHRONOLOGICAL LAYERS OF HIGH-ALTITUDE GLACIERS,
E. N. Davydov, K. P. Makhon'ko, M. A. Tsevelev, and Z. S. Shulepko.
In: Nuclear Meteorology, Proceedings of the All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 29-36, 1 fig, 5 tab, 12 ref.

Descriptors: Meteorology, Nuclear energy, *Nuclear explosions, *Fallout, *Glaciers, *Ice, *Firn, *Snow, Measurement, Strontium, Cesium, Cerium, Manganese, Ruthenium, Lead, Migration, Movement, Radioisotopes.

The contents of Sr-90, Cs-137, Ce-144, Mn-54, Ru-106, and Pb-210 are determined in chronological layers of neve and ice in high-altitude glaciers of the Caucasus and Tyan-Shan. The annual fallout of Cs-137 determined by means of a cuvette-type collector is found to agree satisfactorily with the fallout determined from the Cs-137 content in the chronological layers of the glacier in the period 1963-1967. A similar comparison for Sr-90 in the period 1956-1967 showed that the proportion of Sr-90 contained in the chronological layers of these glaciers is about 10% of the atmospheric fallout of the isotope, which corresponds roughly to the proportion of Sr existing in indissoluble form. About 90% of Sr-90 and roughly 40% of Pb-210, falling on the glacier surface from the atmosphere, are eliminated together with the melted snow, while Cs-137 hardly migrates at all. The time variation in the fallout of different isotopes, determined from their content in chronological layers of the glaciers, led to the following value for the half-removal period of isotopes of fission products from the atmosphere: T(Sub 1/2) approx. 11 months. The figure for Mn-54 is T(Sub 1/2) approx. 28 months. (See also W75-04054) (Houser-ORNL)
W75-04057

RADIOACTIVE ISOTOPES OF EUROPIUM PRODUCED BY NUCLEAR BLASTS,
S. V. Iokhel'son, I. M. Nazarov, F. Y. Rovinskii, V. P. Chirkov, and E. I. Yushkan.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 37-39, 8 ref.

Descriptors: Meteorology, Nuclear energy, *Nuclear explosions, *Air pollution, *Fallout, Transport, *Radioisotopes, Water pollution, Soil contamination, Mosses, Analytical techniques, Radiochemical analysis, Evaluation, Density, *Nevada.
Identifiers: Nevada Test Site, Lake Rits(USSR), *Europium.

Nuclear blasts lead to the appearance of different radioisotopes of europium: europium-155 (T(sub 1/2) = 1.7 years), europium-156 (T(sub 1/2) = 15.4 days), which are fission fragments, and europium-152 (T(sub 1/2) = 12 years), europium-154 (T(sub 1/2) = 16 years) - products of activation reactions. According to data in the literature, these isotopes were detected in the epicentral region of nuclear tests conducted in Nevada. On the other hand, they have not been detected in the composition of radioactive global contamination of the earth's surface. To determine the contribution of long-lived europium radioisotopes to the global contamination of a locality, a sample of moss gathered in the Caucasus (in the vicinity of Lake Rits) was analyzed by the methods of radiochemistry and gamma-spectrometry. In the sample, in addition to other fragmentation products, the presence of europium-155 was detected and identified reliably for the first time. It was also established reliably that no europium-152 and 154 is present. The density of the global contamination of dry land by europium-155 and its contribution to the gamma-radiation dose were evaluated. (See also W75-04054) (Houser-ORNL)
W75-04058

RATE OF ATMOSPHERIC FALLOUT OF CESIUM-137 AND STRONTIUM-90 AEROSOLS,
A. S. Zykova, E. L. Telushkina, V. P. Rublevskii, G. P. Efremova, and G. A. Kuznetsova.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 57-60, 3 tab, 3 ref.

Descriptors: *Fallout, *Cesium, *Strontium, *Meteorology, *Nuclear energy, Data collections, Aerosols, Air pollution, *Radioisotopes, Measurement.

Data are given on the fallout density of Cs-137 and Sr-90 aerosols in Moscow for the period 1962 to 1968 and on the concentration of these isotopes in the ground layer of atmospheric air. The ratio of Cs-137 and Sr-90 aerosols in radioactive precipitation in these years was always larger than the analogous ratio between these isotopes in air. This leads one to suppose that the fallout rate of aerosols carrying Cs-137 is somewhat larger than the fallout rate of aerosols carrying Sr-90. An assessment of the fallout rate of these aerosols established that, on the average, for the period 1962 to 1968 the fallout rate of Cs-137 aerosols was 1.7 plus or minus 0.4 cm/sec, and of Sr-90 aerosols 1.5 plus or minus 0.4 cm/sec, i.e., the fallout rate of Cs-137 aerosols is larger by 14% than the fallout rate of Sr-90 aerosols. (See also W75-04054) (Houser-ORNL)
W75-04061

STATE OF STRONTIUM-90, CESIUM-137, AND CERIUM-144 IN RADIOACTIVE FALLOUT,
For primary bibliographic entry see Field 5B.
W75-04071

SOME FEATURES OF ATMOSPHERE CLEANSING BY GROUND CONDENSATION,
B. I. Styro, and N. P. Dargene.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 173-181, 3 fig, 1 tab, 6 ref.

Descriptors: *Meteorology, *Radioactivity, *Measurement, *Air pollution, *Dew, Sampling, Polonium, Lead, Bismuth, Radioisotopes, Assay, Fallout, Aerosols, Condensation, Electrochemistry, Research and Development.
Identifiers: *Specific radioactivity.

Simultaneous measurements were conducted of the radioactivity of air and dew samples formed on the upper and lower surfaces of a polyethylene film spread on closely cut grass. The dew samples were collected in two ways: (1) several identical films were spread simultaneously on the grass surface, the sample from the first film being taken immediately after the formation of the dew with subsequent sampling at hourly intervals throughout the night; (2) a single polyethylene film on the selected area was changed hourly and the radioactivity of the dew formed on it determined. The dew samples collected by the two methods were called 'old' and 'new' dew, respectively. The short-lived alpha-radioactivity of the dew due to a decay of 84Po218, 82Pb214, and 83Bi214 was determined. For old dew they lie in the range (0.1-24.5) times 10(-11) curie/mliter, and for the new dew in the range (0.1-26) times 10(-11) curie/mliter. The parameter of radioactivity removal from the air during the fall of dew is (0.02-1) times 10(-4) sec(-1) for old dew and (0.3-1) times 10(-4) sec (-1) for new dew. A parabolic relationship was obtained between the specific radioactivity of new dew and the specific radioactivity of the air, which points to the growth in washout intensity with increasing air radioactivity. The specific radioactivity and the coefficient of nonradioactive removal of radioactive substances by old dew was studied as a function of the amount of fallen dew. It was concluded that atmospheric cleansing occurs mainly: (1) through direct condensation of water vapor on radioactive aerosols; (2) under the influence of electric interactions between the aerosol particles and the dewdrops. (See also W75-04054) (Houser-ORNL)
W75-04078

ACCOUNTING FOR SOME NONSTEADY PROCESSES IN RECORDING NATURAL AIR RADIOACTIVITY,
V. N. Bakulin, and V. P. Matulyavichyus.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 187-193, 2 fig, 5 ref.

Descriptors: *Meteorology, *Radon, *Measurement, *Filters, *Measuring instruments, Air pollution, Equilibrium, Research and development, Radiation, Radioactivity, Theoretical analysis.

The accumulation of radon disintegration products is studied theoretically for recorders with fixed and mobile filters, for constant and linearly increasing concentration of these products in air, taking into account the relation between their concentrations. Neglecting the equilibrium in the radon series can lead to an error several times greater when determining the concentration of radon and its disintegration products in air from measurements of the activity of recorder filters. A formula is proposed for determining constant concentrations of Rn and its disintegration products in air by various suction methods in relation to the degree of equilibrium in the radon series. The optimum filtration time for a recorder with a mobile filter is at most 1.5-2 hrs; longer times do not practically increase the sensitivity of the setup, but increase the recorder's time constant and render more difficult determination of the actual time variation in the concentration of radioactive substances. A method is suggested for determining the relationship between radon disintegration products measured by two counters, one positioned in the path of the recorder film. Very reliable data can thus be obtained for an alpha-recorder, at minimum spacing between the counters. (See also W75-04054) (Houser-ORNL)
W75-04080

LONG-LIVED ALPHA-RADIOACTIVITY IN FALLOUT AT VILNIUS AND AT VARIOUS ATLANTIC LATITUDES,
B. I. Styro, N. K. Shpirkauskaite, V. N. Gasyunas, and V. M. Kuptsov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 201-207, 2 fig, 2 tab, 8 ref.

Descriptors: Meteorology, Nuclear energy, *Radioactivity, *Radioisotopes, *Uranium, *Thorium, *Plutonium, *Fallout, Rain, Precipitation(Atmospheric), Measurement, Analytical techniques, Turbulence, Cyclones, Wind, Latitudinal studies, *Atlantic Ocean, Water pollution.
Identifiers: Alpha radiation.

The isotope composition of long-lived alpha-radiation in atmospheric precipitation at Vilnius and at different latitudes over the Atlantic is investigated. Relevant data were obtained for each 10 deg latitudinal strip between 60 deg N and 70 deg S over the Atlantic from Oct 16, 1966, till March 1, 1967, and from Oct. 21, 1967, till Jan. 26, 1968. The fallout density of long-lived alpha-radioactivity is described by the geographical distribution with maxima at 50 - 40 deg and 20 - 30 deg N and S and with minima at 40 - 30 deg N and S. The U238, Th232, and Pu239 contents in atmospheric

precipitation were measured using an alpha-spectrometer with ion chamber, and their ratios were calculated. For Vilnius, the U238 values are 0.41 to 7.33 times 10(-5) g/g, the Th232 values are 0.014 to 7.27 times 10(-5) g/g, and the Pu239 values are 0.04 to 3.10 times 10(-11) g/g; over the Atlantic the values are 0.18 to 9.5 times 10(-5), 0 to (0.52-1.8) times 10(-5) and 0.06 to 7.37 times 10(-10) g per gram of ash residue, respectively. (See also W75-04054) (Houser-ORNL)
W75-04083

SEASONAL BERYLLIUM-7 VARIATIONS IN GROUND LEVEL AIR,
L. I. Gedenov, Z. G. Gritchenko, and V. M. Flegontov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 208-212, 2 fig, 1 tab, 17 ref.

Descriptors: *Meteorology, *Fallout, *Beryllium, *Rain, *Air pollution, Measurement, Seasonal, Summer, Density, Fluctuations, Microenvironment, Sampling, Correlation analysis, Systems analysis, Date collections.
Identifiers: *Troposphere, *Stratosphere.

The content of cosmogonic Be7 in ground level air and atmospheric precipitation was determined in 1960-1968 in the environs of Leningrad from the gamma-radiation with the aid of a scintillation and a Ge(Li) drift gamma-spectrometer. In periods when the atmosphere was cleansed of short-lived radionuclides of artificial origin, Be7 was determined in daily samples of atmospheric aerosols filtered from the air. Be7 in ground level air sometimes varied tenfold from day to day. A great amount of experimental material was collected in the seven years of observations and an average curve was plotted of the mean-monthly variation of Be7 concentration in ground level air. It was thus possible to distinguish a constant and a variable component in the variation of Be7 concentration. Be7, continuously being formed in the troposphere, is apparently the constant component, with superimposed periodic components due to seasonal Be7 penetration from the stratosphere, attaining great values in summer. A statistical analysis of the variable component showed that it is well described by a Gauss function of type P(t) approx. e(-t sq/2 sigma sq), where t is the number of days elapsed from the peak Be7 concentration in the ground level air, and sigma = 60 plus or minus 2 days is the parameter of the Gaussian distribution. Be7 concentration in ground level air is highest every June, (9 + 1) times 10(-14) curie/m cu, and lowest in December (3.5 plus or minus 1) times 10(-14) curie/m cu. There is a 3-to-2 ratio of the overall number of Be7 atoms in ground level air arriving from the stratosphere to those arriving from the troposphere. A constant average of (4.6 plus or minus 0.2) times 10(-5) atom of Be7 is deposited annually per square centimeter of ground in the Leningrad area. (See also W75-04054) (Houser-ORNL)
W75-04084

CONCENTRATION OF SODIUM RADIOISOTOPES IN THE GROUND LAYER OF THE ATMOSPHERE AND IN PRECIPITATION,
R. Y. Yasyulenis, V. Y. Luyanas, and B. I. Styro.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 213-215, 1 fig, 1 tab, 7 ref.

Descriptors: *Meteorology, *Sodium, *Fallout, *Rain, Precipitation(Atmospheric), Measurement, Argon, Air pollution, Atmosphere, Correlation analysis, *Radioisotopes.
Identifiers: Cosmic radiation, Cosmogonic radioisotopes.

Measurements of sodium isotope concentrations in rainwater are examined. The sodium was extracted with KU-2 cationite, Na22 was measured from the positronic radiation, and Na24 from beta-gamma coincidences. The ratios of Na22 and Na24 concentrations in the same rainwater sample were 70 and 120. The measured ratios are compared with theoretical evaluations of the concentration ratios in the air. (See also W75-04054) (Houser-ORNL)
W75-04085

CONCENTRATION OF PHOSPHORUS RADIOISOTOPES IN THE GROUND LAYERS OF THE ATMOSPHERE AND IN PRECIPITATION,
D. A. Shopauskene, and V. P. Shvedov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 216-219, 1 fig, 2 tab, 8 ref.

Descriptors: *Meteorology, *Fallout, *Phosphorus, *Measurement, *Air pollution, Sampling, Argon, Precipitation(Atmospheric), Rain, Radioisotopes, Correlation analysis.
Identifiers: Cosmic radiation, Interaction, Torrential rain.

Results of systematic measurements of P32 and P33 concentrations are reported. The measurements were carried out in 1967-1969 in the areas of Vilnius, Lithuania, and Cornesti (Moldavian SSR). The maximum values reached 13.8 times 10(-15) curie/m cu for P32 and 3.6 times 10(-15) curie/m cu for P33; the minima did not exceed 0.4 and 0.15 times 10(-15) curie/m cu, respectively, in air samples taken from the ground layer of the atmosphere. The average P32 concentration in atmospheric precipitation was 0.47 times 10(-12) curie/liter at Vilnius; in samples taken from torrential rains at Cornesti the P32 concentration reached 10.9 times 10(-15) curie/liter. (See also W75-04054) (Houser-ORNL)
W75-04086

RADIUM-226 IN ATMOSPHERIC PRECIPITATION, AND THE POSSIBILITIES FOR LEAD-210, BISMUTH-210 AND POLONIUM-210 TO PENETRATE THE ATMOSPHERE FROM THE EARTH'S SURFACE,
V. D. Vilenskii.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 220-223, 2 tab, 9 ref.

Descriptors: *Meteorology, *Radioisotopes, *Radium, *Lead, *Bismuth, *Polonium, *Fallout, *Air pollution, Measurement, Precipitation(Atmospheric), Rain, Atmosphere.

The intensity of atmospheric Ra226 and Pb210 fallout in the Moscow area in 1967-1969 was determined. It varied between 0.08 and 1.8 micron curie/km2. day for Ra226 (mean-annual value 0.18 mcurie/km2.year) and between 1 and 18.6 micron curie/km2.day for Pb210 (mean-annual value 2.1 mcurie/km2.year). The ratio of Ra226 to Pb210 concentrations in atmospheric precipitation varied between 0.024 and 0.222, the mean-annual value being 0.086. Assuming Ra226 penetrates the atmosphere from the earth's surface along with dust, the proportions of Pb210, Bi210 and Po210 penetrating the atmosphere with the dust have been evaluated along with the overall concentration of these radioisotopes in atmospheric precipitation. The natural radioactivity of atmospheric dust is shown to possibly influence the proportion of isotopes used for evaluating the rate of atmospheric scavenging. (See also W75-04054) (Houser-ORNL)
W75-04087

POLONIUM-210 IN THE ATMOSPHERE AND ITS RATIO TO LEAD-210,
S. S. Shalaveyus, and B. I. Styro.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 224-231, 3 fig, 1 tab, 8 ref.

Descriptors: *Meteorology, *Polonium, *Lead, *Atmosphere, *Air pollution, Precipitation(Atmospheric), Rain, Scavengers, Sampling, Analytical techniques.

The Pb210 and Po210 concentrations in atmospheric air and precipitation were measured in the environs of Vilnius. Po210 was determined from its alpha-activity after being separated from the other alpha-radiating elements by spontaneous precipation on copper. The purity of Po210 separation was checked with the aid of A-2 nuclear emulsions. EDE-10P anionite was used to separate Pb210. The chemical yield was determined from the carrier, and the purity from the Bi210 accumulation curve. In 1966-1968, the Po210 concentration in atmospheric air was 3.5 to 71.4.10-16 curie/m3. The Po210/Pb210 ratio in that period fluctuated between 0.07 and 0.22; the higher values indicate that air in which Pb210 and Po210 has accumulated for a long time was sometimes released into the ground layer. In 1967-1968, the Po210 concentration in precipitation varied between 0.2 and 1.9.10-12 curie/liter, and the Po210/Pb210 ratio varied between 0.1 and 0.37. An inverse correlation was found between the Po210 concentration in precipitation and that in the atmosphere. The average residence time of Po210 and Pb210 in the atmosphere was about 32 days. (See also W75-04054) (Houser-ORNL)
W75-04088

TIME FLUCTUATIONS OF LEAD-210 CONCENTRATION IN THE GROUND LAYER OF THE ATMOSPHERE,
S. G. Malakhov, V. A. Trufakin, and Z. S. Shulepko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 232-238, 5 tab, 12 ref.

Descriptors: *Meteorology, *Air pollution, *Atmosphere, *Lead, *Troposphere, Measurement, Environmental effects, Fluctuations, Seasonal, Stability, Arctic, Anarctic, Land, Oceans.

Data on the mean-annual Pb210 concentration in the ground layer of the atmosphere are given for various points in the world. This concentration varies between 10-14 and 10-15 curie/m3 deep inland, 1 and 2.10-15 curie/m3 over the oceans in the northern hemisphere, and equals 10-15 curie/m3 in the polar areas of both hemispheres. Measurements in the Antarctic have revealed seasonal variations with a maximum in summer. Short-term (2-3 day) fluctuations are studied and assessed from measurements around Kirov. Cold-air advection from the Arctic usually reduces considerably the Pb210 concentration. (See also W75-04054) (Houser-ORNL)
W75-04089

FILTERING AEROSOLS WITH NATURAL ATMOSPHERIC RADIOACTIVITY THROUGH FIBROUS MATERIALS,
B. I. Ogorodnikov, V. I. Skitovich, and E. A. Sitalo.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 245-254, 7 fig, 1 tab, 16 ref.

Descriptors: *Meteorology, *Filters, *Atmosphere, *Radioactivity, *Radon, Separation techniques, Filters, Particle size, Efficiencies, Evaluation, Fibers, *Aerosols.
Identifiers: *Fibrous materials.

It has been proved experimentally that, at a filtration rate of about 150 cm/sec, FPP-15 and FPA-15 materials have approximately the same efficiency, but the former is more effective at a rate of about 1 to 10 cm/sec owing to the presence of electrostatic charges on its fibers. FP material is suitable for use in the upper atmosphere, as its efficiency in trapping aerosols of all sizes increases. For in-

stance, the efficiency of FPA-15 material in trapping aerosols of about 0.035 micron particle radius at filtration rates of 1 to 65 cm/sec is approximately 10 to 12 times as high at 27 km as at ground level. Study of radioactivity distribution over the layers of the filtering material has shown that particles of that size account for 40 to 60% of the radioactivity of radon daughter products in the ground layer of the atmosphere. EP filtering was studied experimentally with air containing coarse aerosols (1 to 15 micron) and with practically pure air containing a large amount of free atomic Ra daughter products. The 'free' products filter with very high efficiency with a high diffusion coefficient, even at rates of 300 cm/sec. (See also W75-04054) (Houser-ORNL)
W75-04091

DEVELOPMENT OF A METHOD FOR DETERMINING THE SIZE DISTRIBUTION OF RADIOACTIVE AEROSOLS WITH THE AID OF FILTERING MATERIALS,
B. I. Ogorodnikov, E. A. Sitalo, V. I. Skitovich, and I. E. Konstantinov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 255-258, 2 fig, 2 tab, 5 ref.

Descriptors: *Meteorology, *Radioactivity, *Filters, Efficiencies, Research and development, Methodology, *Aerosols, Size, Distribution, *Radioisotopes, Zirconium, Cesium, Beryllium.
Identifiers: Fibrous materials.

The efficiency of aerosol trapping by fibrous FP filtering materials depends on the rate of filtration, the diameters of the aerosol particles and of the filter fibers, and the thickness of the filtering layer. Through the right choice of parameters, one can achieve a selective retention of aerosols of a certain size range in the successive layers of filtering materials. The filtering characteristics of FPP-3, FPP-70 and FPA-100 materials were determined in the laboratory with aerosols of 0.035 to 0.5 micron particle radius. Linear filtration rates of about 1.5-2.0 m/sec were found to be adequate for investigating the size distribution of artificial radioactive aerosols, when the aerosols are mainly trapped by inertial effect. In this case, if FPP-70--0.3 material is used in the front layer and FPP-3--1.2 in the rear, the first filter retains over 95% of the aerosol particles of 0.5 micron radius and less than 20% of the particles of about 0.035 micron radius. The latter are practically all trapped by the rear filter. Various combinations of layers of FPP-70 and FPP-3 filtering materials were tested while taking radioactive aerosol samples at filtration rates of 1.0 to 1.6 m/sec. Much of the Zr95, Cs137 and Be7 is bound to particles of 0.2 to 0.25 micron average radius. For all isotopes, at least 10% of the overall activity is carried by particles below 0.1 micron. (See also W75-04054) (Houser-ORNL)
W75-04092

PRELIMINARY DATA ON THE MEASUREMENT OF THE ATMOSPHERIC AEROSOL CHARACTERISTICS WITH A CENTRIFUGAL SPECTROMETER,
Y. N. Redkin.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 259-272, 8 fig, 14 ref.

Descriptors: *Meteorology, Measurement, *Aerosols, *Instrumentation, *Radioactivity, Research and development, Theoretical analysis, Evaluation, Efficiencies, Model studies, Centrifugation, *Spectrophotometry, *Pollutant identification.
Identifiers: *Spectrometers.

An aerosol spectrometer is described which makes it possible to obtain continuous spectra of particles for Stokes radii RS between 0.4 and 10 micro. A relationship phi = phi(RS) whose log-log plot for particles of RS greater than 10-4 cm is almost a straight line is derived from the equation of particle motion in a viscous space for a rotating system of coordinates. Here phi is the angle of particle deviation from a radius passing through the point from which the particle started moving. The spectrometer model was built as a hollow, rotating steel disk, through the axis of which aerosol is pumped. Owing to centrifugal sedimentation, part of the dust penetrates special slots to form a pencil of rays splitting more and more as the particles move away from the axis of rotation. The coarser the particle, the larger the angle of its deviation. A theoretical evaluation of the efficiency of this device showed it to depend very little on particle size at RS greater than 10-4 cm (Being 65 to 70%), as confirmed by the results of a calibration using puffball and lycopodium spores. The distribution of alpha-activity of particles of RS = 0.4.10-4 cm varies little and is almost only a hundredth of the specific overall alpha-activity measured on ar FPP filter. (See also W75-04054) (Houser-ORNL)
W75-04093

MEASURING THE CONCENTRATION OF HIGHLY-DISPERSE RADIOACTIVE AEROSOLS BY THE DIFFUSION METHOD,
S. V. Kolerskii, Yu. V. Kuznetsov, S. O. Lekhtmakher, N. M. Polev, and L. S. Ruzer.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 273-278, 2 fig, 1 tab, 12 ref.

Descriptors: *Meteorology, *Measurement, *Aerosols, *Radioactivity, Methodology, *Diffusion, Dispersion, Atmosphere, Gases, Particle size.
Identifiers: Coefficient of deposition.

Described is the application of the diffusion method to the determination of the proportion of free atoms and of all the ultrahighly disperse aerosols (molecular complexes) formed through interaction of free atoms with the molecules of the various gases in the air, in the overall concentration of radioactive aerosols of emanation daughter products in the air. The coefficient of deposition of ultrahighly disperse particles in a cylindrical channel, calculated from formulas of Gormley and Kennedy, is affected by an error of 3 to 5% at most, due to the fact that the variable distribution of flow velocities in the inflow section of the channel is disregarded in the formulas. The errors of the method are discussed, and the method is shown to facilitate reliable measurements of the proportion of ultrahighly disperse radioactive aerosols of emanation daughter products, if this proportion is at least 10 to 20%. (See also W75-04054) (Houser-ORNL)
W75-04094

SEPARATE DETERMINATION OF RN, RAA, RAB, AND RAC CONCENTRATIONS IN AIR FROM THE ALPHA-ACTIVITY DECAY CURVE OF A FILTER,
V. N. Bakulin, and B. G. Starikov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 279-285, 3 fig, 1 tab, 18 ref.

Descriptors: *Meteorology, *Fallout, *Radon, *Air pollution, *Soil contamination, Filtration, Separation techniques, Troposphere, Turbulence, Polonium, Lead, Bismuth.
Identifiers: Alpha activity, Decay curve, Daughter products.

The relationships between radon and its decay products are of interest when studying turbulent agitation and contaminant washout processes in the lower troposphere. An examination of the different methods of separate determination of the concentrations of radon daughter products shows that only some of them yield satisfactory results at low atmospheric concentrations of radon. An analytical analog has been developed of the graphical method of separate determination of Po218, Pb214 and Bi214 concentrations from the curve of filter alpha-activity decay; the analog is as accurate as the least squares method for three unknowns, but the calculations are incomparably simpler. A comparison of these methods for known proportions of the radon decay products proved the adequacy of the proposed method. The existence of standard proportions between the short-lived radon decay products under natural conditions was demonstrated; they make it possible to determine the concentration of each of them from the alpha-decay curve within 11 to 60 min from the end of filtration. (See also W75-04054) (Houser-ORNL)
W75-04095

NEW METHODS OF MEASURING RN220 (THORON) EXHALATION AND SOME RESULTS,
B. I. Styro, T. N. Nedvetskaite, and E. E. Sen'ko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 286-292, 4 fig, 4 tab, 10 ref.

Descriptors: *Meteorology, *Measurement, Methodology, *Radon, *Thoron, Research and development, *Instrumentation, Ion exchange, Absorption, Sites, Data collections.
Identifiers: Exhalation, Pearson collector, Ion chamber.

Two new methods are proposed for the measurement of Rn220 exhalation. One uses a Pearson collector combined with a decay chamber for radioactive emanations. In the other, the Pearson collector is replaced by an accumulation chamber connected to three auxiliary decay chambers through which the air flows in from the surrounding space with already decaying Rn220. At the same time, these chambers serve for equalizing the pressure in the accumulator. After passing through the decay chamber, the Rn220 and Rn222 daughter products formed there were trapped on an LFS-1 filter which, after 6 hours of Rn222 daughter products decay, was brought into contact with an A-2 nuclear emulsion. The setups were calibrated with Tb232 salt which was in equilibrium with the decay products. Since the calibration coefficient at low sampling rates fluctuated between 2 and 5%, the air penetrating the decay chamber was ionized by corona discharge and nuclear emulsions helped considerably in raising the lower sensitivity limit of Rn220 exhalation measurement (10 to the minus 17 to 10 to the minus 18 curie/sq cm.sec depending on sampling duration). The error of Rn220 exhalation measurement by these two methods does not exceed 20%. Data are provided on the diurnal variation in Rn220 exhalation and mean exhalation values for various states of the earth's surface. (See also W75-04054) (Houser-ORNL)
W75-04096

A SIMPLE TWO-DIMENSIONAL ANALYZER OF BETA-GAMMA COINCIDENCES IN THE STUDY OF RADIOACTIVE FALLOUT SAMPLES,
E. F. Kovnatskii, E. I. Roslyi, and A. N. Silant'ev.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 293-296, 2 fig, 4 ref.

Descriptors: *Radiation, *Measurement, *Environment, *Instrumentation, Design criteria, Data collections, *Spectrophotometry, Pollutant identification.
Identifiers: *Spectrometer.

A two-dimensional analyzer of beta-gamma coincidences, based on two commercial AI-100 analyzers is described. The setup facilitates the recording of coincidence spectra during the measurement, on a punch tape on which are recorded, at the end of the measurement, the beta and gamma spectra picked up by a single-crystal spectrometer. A functional circuit of the setup and a diagram of the control unit are given. (See also W75-04054) (Houser-ORNL)

W75-04097

SPECTROMETRIC METHOD OF MEASURING THE CONCENTRATION OF NATURAL RADIOACTIVE AEROSOLS,
V. G. Labushkin, V. I. Popov, and L. S. Ruzer.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 297-309, 5 fig, 2 tab, 27 ref.

Descriptors: *Meteorology, *Radioactivity, Measurement, *Assay, *Aerosols, Radioisotopes, Radon, Thoron, Instrumentation, Environment, Methodology, *Spectrophotometry, *Pollutant identification.
Identifiers: Spectrometers.

Discussed is a spectrometric method of determining the concentration of natural atmospheric radioactive aerosols formed by radon and thoron decay daughter products. The determination of radon daughter product concentrations is accompanied by measurement of the alpha(minus) and beta(minus) activity of the disperse phase of aerosols deposited on a fine-fibered LFS-1 (AFA--RSP-10,20) filter by means of scintillation spectrometric detection units. For a simultaneous measurement of the concentration of daughter products of both radon and thoron, one can use a spectrometric unit for the detection of alpha(minus) radiation, composed of 0.3 to 0.4 mm thick CsI(TI) crystal of 63 mm diameter and a FEU-52 photomultiplier. The adoption of these spectroscopic methods considerably reduces the error and, in addition, facilitates determination of the self-absorption of alpha(minus) radiation in the aerosol sample and the dust content of the air. Also reported is an investigation of the spectrometric unit for the detection of alpha(minus) radiation from a wide-area (over 100-cm sq) aerosol sample. The unit consists of CsI (TI) crystal and a FEU-49 photomultiplier. The topography of the photocathode sensitivity was plotted with the aid of a Pu-239 spectrometric point source. The apparatus used for measuring the concentration of natural radioactive aerosols by spectrometric methods is described. (See also W75-04054) (Houser-ORNL)
W75-04098

ISOTOPE ANALYSIS OF RADIOACTIVE FALLOUT AND AEROSOL SAMPLES BY BETA-SPECTROMETRY,
A. N. Silant'ev, T. V. Polyakova, F. A. Rabotnova, and I. G. Shkuratova.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 310-314, 2 fig, 2 ref.

Descriptors: *Radioisotopes, *Measurement, *Instrumentation, *Design criteria, Radium, Praseodymium, Yttrium, Strontium, Analytical techniques, Methodology, *Spectrophotometry, *Pollutant identification.

Discussed is a method for determining the content of radium-106, praseodymium-144, yttrium-90, and strontium-89 isotopes by beta-spectrometric analysis, involving the use of a scintillation beta-spectrometer with a plastic 20-mm-thick scintillator of 70-mm diameter. Only beta radiation of energies above 630 keV is taken into account when processing spectra. The measured spectra in the range of 630 keV to 3.5 MeV are subdivided into intervals so that a system of equations holds. (See also W75-04054) (Houser-ORNL)
W75-04099

RAPID SYSTEM OF AUTOMATIC PUNCH-TAPE OUTPUT OF INFORMATION FROM THE AI-100-1 ANALYZER,
N. F. Mazurin, V. P. Solov'ev, and V. N. Churkin.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 315-318, 2 fig, 1 ref.

Descriptors: *Radioisotopes, *Measurement, *Instrumentation, *Design criteria, Methodology, Remote sensing, Automation, Data collections, Data transmission, Geophysics.
Identifiers: *Multichannel analyzer, Gamma-spectrum.

Described is the SAPAR-1m system of automatic punch-tape output of information from a 'Raduga' (AI-100 -- 1) multichannel amplitude analyzer of pulses in the code of the 'Minsk-2' or 'Minsk-22' computer. The block diagram of the system includes an AU-100 -- 1 analyzer, a code-conversion and puncher-control circuit, and a PL-80 tape puncher. In contrast to earlier setups, the code-conversion and puncher-control circuit is transistorized, and thus faster and more reliable. The top speed of the SAPAR-1m entirely depends on the top speed of the puncher; with the PL-800 puncher, it attains 12 channels per second. Automatic punching of measurement data, combined with machine processing of amplitude spectra on the 'Minsk-22' computer, has almost completely eliminated manual operations from gamma-spectrum processing. (See also W75-04054) (Houser-ORNL)
W75-04100

GRAPHOANALYTICAL METHOD FOR DETERMINING CESIUM-137 CONCENTRATION IN SOIL SAMPLES FROM THE GAMMA SPECTRUM,
V. N. Churkin.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 319-334, 6 fig, 3 tab, 12 ref.

Descriptors: *Soil contamination, *Cesium, *Measurement, *Radiation, Analytical techniques, Design criteria, Remote sensing, Aircraft, *Spectrophotometry, *Pollutant identification.
Identifiers: Gamma spectrum.

The high-energy part of the amplitude distribution of pulses in the region of the Cs137 photopeak of 680-740 keV is shown to be fairly well approximated by a Gaussian curve, if the Cs137 photopeak in the gamma spectrum of the soil samples is separated from the right-hand base of the curve 'parallel to the level of the natural background.' This facilitates graphoanalytical determination of the Cs137 photopeak area along with calculation of the concentration of this isotope in the soil. Components due to interfering radiation of natural and artificial isotopes need not be taken into account. The threshold sensitivity for a 50% statistical error of measurement is 2 times 10(-13) curie/g. The method is five to eight times as efficient as known methods. It is assumed that it also applies to measurements in situ, e.g., when Cs137 concentration in the soil cover is investigated from aboard aircraft or automobiles. (See also W75-04054) (Houser-ORNL)
W75-04101

RADIOCHEMICAL METHOD OF DETERMINING LOW STRONTIUM-90 CONCENTRATION LEVELS IN ENVIRONMENTAL SAMPLES,
V. B. Chunichev.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 335-339, 8 ref.

Descriptors: Analytical techniques, Measurement, *Assay, *Strontium, *Sea water, *Radiochemical analysis, Sampling, Environment, Efficiencies, *Pollutant identification.

A radiochemical method for determining Sr90 in 10 liters of seawater is described in detail. It involves a low-background radiometric setup (background of 4 to 6 counts per hour), intended for measuring the beta-radiation of the daughter Y90. The method significantly facilitated the taking and preliminary processing of seawater samples, reduced the consumption of reagents such as soda and hydrochloric acid, eliminated the use of ammonium chloride, and increased the relative yield of strontium. Analysis of the carbonate concentrate became three times as efficient as analysis of the concentrate from a 100-liter sample. Sr90 can be determined in 2-liter seawater samples without a flame photometer. The method was also used to study the sea bottom, at Sr90 concentration levels of 10(-12) curie. (See also W75-04054) (Houser-ORNL)
W75-04102

FALLOUT AND ACCUMULATION OF RADIOACTIVE DECAY PRODUCTS IN 1966-1968 IN THE VICINITY OF LENINGRAD,
For primary bibliographic entry see Field 5B.
W75-04103

PENETRATION OF RADIOACTIVE FISSION PRODUCTS FROM 1964-1967 NUCLEAR TESTS INTO THE GROUND LAYER OF THE ATMOSPHERE IN THE LENINGRAD AREA,
For primary bibliographic entry see Field 5B.
W75-04104

STUDY OF THE RESISTANCE OF FIBROUS FILTERING MATERIALS IN RAREFIED AIR,
I. V. Petryanov, B. I. Ogorodnikov, and L. A. Zimina.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 353-357, 2 fig, 2 tab, 7 ref.

Descriptors: Research and development, *Filters, *Filtration, *Porous media, Compaction, *Resistance, *Flow resistance, Equations, Mathematics, Viscosity, Viscous flow, Gases, Air.
Identifiers: Filter fibers.

The resistance of fibrous FP filtering materials in a flow of rarefied air is studied. The material resistance Delta p was found to decrease with increasing length Lambda of the mean free path of the gas molecules, because the gas flow glides along the filter fibers, and at normal atmospheric pressure the resistance of almost all FP materials is already lower than its maximum. For FPP-5, LFS-2, and FPP-15 materials, which consist of ultrafine fibers, the loss of resistance is 10-20%. Higher compaction Beta leads to a slight additional drop in resistance from the maximum for the given compaction. The resistance of FP materials under gliding flow conditions can be computed. (See also W75-04054) (Houser-ORNL)
W75-04105

VERTICAL DISTRIBUTION OF THE CONCENTRATION OF RADON DECAY PRODUCTS IN THE 0-300-M LAYER,
For primary bibliographic entry see Field 5B.
W75-04106

NATURAL SNOWFLAKE RADIOACTIVITY DUE TO SHORT-LIVED RADON DECAY PRODUCTS,
A. S. Avramenko, and K. P. Makhon'ko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 361-371, 8 tab, 10 ref.

Descriptors: *Meteorology, *Snow, *Radiation, *Assay, *Measurement, *Radon, Sampling, Mass, Precipitation(Atmospheric), Aerosols, Clouds, Coagulation.
Identifiers: *Snowflakes, Specific radioactivity.

Discussed is snowflake radioactivity due to short-lived products of radon decay. Nuclear photoplatex of the A-2 type were used as indicator. Of the 3106 snowflakes measured, 1270 were radioactive. The frequency of the specific radioactivity of snow flakes has two maxima, at C = 0 and

at C = 16 to 32 times 10(3) alpha-tracks per gram, and one minimum at C = 4 to 8 times 10(3) alpha-tracks per gram. The number of nonradioactive snowflakes and the specific snowflake radioactivity decreases with increased snowflake mass. A scheme for the radioactivation of snowflakes in order to examine the patterns obtained is also discussed. The coagulation constant of radioactive aerosols with the cloud element is assessed from experimental data on the number of nonradioactive snowflakes. (See also W75-04054) (Houser-ORNL)
W75-04107

TRACE ELEMENTS AND NATUR RADIOACTIVITY IN CLOUD WATER AND ATMOSPHERIC PRECIPITATION IN THE CENTRAL CAUCASUS MOUNTAINS,
E. P. Makhon'ko, A. S. Avramenko, and K. P. Makhon'ko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 372-379, 5 tab, 14 ref.

Descriptors: *Meteorology, *Radioisotopes, Measurement, *Atmosphere, *Precipitation(Atmospheric), *Clouds, *Trace elements, Climatology, Fallout, Sampling, Air, Water chemistry, Aerosols, Particle size.

Total concentrations of short-lived radon decay products in precipitation, cloud water and air were measured in summer on the Terskol peak of the Central Caucasus, along with the concentrations of Fe, Pb, Mn, Ni, and Mg. The precipitation samples were taken in polyethylene vessels, the cloud-water samples were taken with the aid of a battery of four parallel cyclones, while the atmospheric aerosol samples were taken by means of a filtering setup with an FPP-15-1.5 filter. The admixture concentrations obtained are similar in the precipitation and the cloud water, as are the corresponding coefficients of admixture concentration (concentration ratios of water to air), i.e., the contamination of precipitation takes place mainly in the cloud. The assessed 'lifetime' of the trace elements in the atmospheric layer subjected to precipitation washout (1.4 days), concentration coefficient (6 times 10 to the 5th power), and rate of 'wet precipitation' (1.2 km/day) correspond approximately to the values for natural radioactivity (2 times 10 to the 5th power and 0.8 km/day), and with literature data for macroelements and nuclear explosion products. This is an indication that the aerosol carriers of these admixtures in the atmosphere have similar properties, mainly similar particle sizes. (See also W75-04054) (Houser-ORNL)
W75-04108

AN AUTOMATED METHOD FOR THE DETERMINATION OF FORMALDEHYDE IN SEWAGE AND SEWAGE EFFLUENTS,
Water Pollution Research Lab., Stevenage (England).
C. C. Musselwhite, and K. W. Petts.
Water Pollution Control, Vol 73, No 4, p 443-448, 1974. 4 fig, 7 tab, 3 ref.

Descriptors: *Sewage, *Analytical techniques, *Monitoring, *Water quality control, Boating, Water pollution sources, Boats, Boating regulations, *Automation, *Pollutant identification, Analytical techniques.
Identifiers: *Formaldehyde, Technicon Auto analyzer.

The discharge of sewage from pleasure boats has been cited as an increasing source of pollution. Control of this discharge requires the mandatory use of chemical toilets which will be discharged for treatment ashore, probably to be treated in combination with other sewage. Since some of the chemical additives to the toilets contain a high proportion to formaldehyde, which is toxic to some fish at levels above 50 mg/liter, it is necessary to know the formaldehyde content of this treated sewage before it is discharged to water. A procedure is described for using a Technicon Auto Analyzer to quickly and accurately monitor the formaldehyde level. The mehtof utilizes the reaction of formaldehyde with acetylacetone in the presence of an excess of an ammonium slat to form a yellow compound, diacetyldihydrolutidine, whichis measured colorimetrically. The methods outlined will give reproducible results in the range of 0.10 to 25.0 mg/liter of free and combined formaldehyde and in the range of 0.05 to 10.0 mg/liter of distilled formaldehyde. It is proposed that the automated processes should be used for the routine monitoring of total formaldehyde present in sewage and sewage effluents. (Orr-FIRL)
W75-04112

NEW SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF HEXAVALENT CHROMIUM IN WATER,
Indian Defence Research and Development Establishment, Gwalior.
R. Prasad, and S. Ramanujam.
Research and Industry, Vol 19, No 1, p 26-29, March, 1974. 1 fig, 7 tab, 6 ref.

Descriptors: *Spectrophotometry, *Chromium, *Toxicity, Water pollution, Water quality standards, Metals, Water quality control, *Pollutant identification, Analytical techniques, Potable water.
Identifiers: *Hexavalent chromium, O-tolidine hydrochloride-tartaric acid reagent, Analar potassium dichromate, Sodium fluoride, Beer's Law.

The blue color developed with O-tolidine hydrochloride-tartaric acid reagent in the presence of aqueous sodium fluoride, is the basis for a quantitative method for the spectrophotometric evaluation of hexavalent chromium in drinking water at 600 millimicrons. Hexavalent chromium is a toxic inorganic element in potable water. The maximum amount permissible is 0.05 ppm. The standard hexavalent chromium solution consists of the dissolving of 0.1414 g Analar potassium dichromate in distilled water, making the volume up to 100 ml. Twenty ml of this solution were made up to 1000 ml to create the standard solution consisting of one microgram hexavalent chromium per ml. O-tolidine hydrochloride tartaric acid was prepared by dissolving 0.5 g freshly prepared pure O-tolidine hydrochloride and 0.5 g pure tartaric acid in distilled water, making a volume of 100 ml. One g pure sodium fluoride dissolved in water made up to 100 ml and kept separately. The null balance method in a one centimeter cell of Unicam SP 500 series 2 ultraviolet and visible spectrophotometer in the visible range utilizing tungsten lamp was used to determine the optical density measurements. The hexavalent chromium solution was treated with one ml of O-tolidine hydrochloride-tartaric acid reagent and one ml of sodium fluoride solution, making up to 10 ml with distilled water. The blue color was stable for about one hour. The solution was measured in the spectrophotometer for 26 to 30 minutes at wavelengths ranging from 400 to 650 millimicrons. (Leibowitz-FIRL)
W75-04113

DICHROMATE RELUX CHEMICAL OXYGEN DEMAND: A PROPOSED METHOD FOR CHLORIDE CORRECTION IN HIGHLY SALINE WASTES,
Jacobs Engineering Co., Pasadena, Calif.
F. J. Baumann.
Analytical Chemistry, Vol 46, No 9, p 1336-1338, August, 1974. 1 fig, 3 tab, 4 ref.

Descriptors: Water pollution control, Salinity, *Chlorides, Waste water treatment, *Oxidation, *Chemical oxygen demand, *Saline water, *Pollutant identification.
Identifiers: *Dichromate reflux method, Mercuric sulfate, Chloride oxidation, Saline wastes.

Chloride interferes with methods which attempt to determine chemical oxygen demand by strong wet oxidative means in saline wastes. Mild oxidizing conditions inhibit chloride oxidation, but only at the expense of inefficient oxidation of organic matter. In the determination of COD the dichromate reflux method uses acid concentrations and heating times which oxidize about 85-95 percent of the organic matter present, while oxidizing the chloride ion 100 percent as well. The chloride interference can be greatly inhibited through the addition of mercuric sulfate to form unionized mercuric chloride. The complexing method using a weight ratio of HgSO4:Cl at 10:1, yields reproducible results at chloride concentrations up to 5,000 mg/liter. Chloride interference problems occur in wastes of low to moderate COD with chloride concentrations approaching that of seawater. True values for oxygen consumed from dichromate are determined in highly saline wastes and seawater by the employment of the chlorine-recovery method, without the requirement of prior chloride determination or dependence on an excess of mercury which does not achieve complete sequestration of chloride. (Leibowitz-FIRL)
W75-04124

EVALUATION OF EDDHA AS AN EXTRACTION AND ANALYTICAL REAGENT FOR ASSESSING THE IRON STATUS OF SOILS,
Nevada Agricultural Experiment Station, Reno.
For primary bibliographic entry see Field 2G.
W75-04144

SYMPOSIUM ON POPULATION EXPOSURES,
Health Physics Society, East Weymouth, Mass.
For primary bibliographic entry see Field 5C.
W75-04152

DATA NEEDS FOR THE ASSESSMENT OF POPULATION DOSE FROM BACKGROUND RADIATION,
Health and Safety Lab. (AEC), New York.
W. M. Lowder, J. H. Harley, and J. E. McLaughlin.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 23-29, 3 tab, 9 ref.

Descriptors: *Human population, *Radioactivity, *Public health, *Basic data collection, *Background radiation, Measurement, Analytical techniques, Assessment, Assay, Safety, Evaluation, Radon, Gamma rays.
Identifiers: *Dose.

In the course of preparation of two National Council on Radiation Protection and Measurement (NCRP) reports on the dose to the U.S. population from background radiation and on techniques of measurement, several significant sources of uncertainty that are relevant to all studies of human population exposure to this background have been identified. These include (1) the extremely limited data on gamma radiation and airborne radon levels in the indor environment and their dependences on the properties and radionuclide contents of building materials; (2) possible inadequacies in the models used to relate radiation or radionuclide measurements to human organ dose; and (3) possible uncertainties in the dose contributions of cosmic ray charged particles (ca 10 percent). In addition, the need for considerably more detailed information on the time variations of the various components of background radiation is relevant to the quantitative assessment of small additions to the overall radiation exposure produced by man-made radionuclides in the environment. These considerations become more critical when realistic population dose estimates are desired for a limited geographic region, particularly a highly urbanized area. In most such situations, reasonably extensive measurement programs would be required. Existing information on typical radionuclide dis-

tributions, radiation fields, and component doses such as is contained in forthcoming NCRP reports would provide useful guidance in the design of such programs. (See also W75-04152) (Houser-ORNL)
W75-04156

THE USE OF AN AUTOMATED POPULATION DATA BASE IN POPULATION EXPOSURE CALCULATIONS,
Office of Radiation Programs, Silver Spring, Md. Electromaganetic Radiation Analysis Branch.
T. W. Athey, R. A. Tell, and D. E. James.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 29-36, 4 tab, 3 ref.

Descriptors: *Human population, *Radioactivity, *Measurement, *Computer programs, Geography, Census, Fuels, Mathematics, Assessment.
Identifiers: *Population exposure, Radioactivity release, Dose calculations, Fuel cycle, Nonionizing radiation, Fuel reprocessing.

The assessment of potential hazard to the population from a source in the environment often requires a knowledge of the specific geographic population distribution around the source. A computer program package and data base, developed primarily for marketing purposes in the U.S. Department of Commerce, were adapted for use in a number of population exposure problems in the ionizing and nonionizing radiation areas. The data base consists of the U.S. Census Bureau Master Enumeration District List with coordinates. For each of the 250,000 census enumeration districts (CEDs), the total population and housing units, the state and county code, and the latitude and longitude of the population centroid are given. The average population in a CED is 800, and this is approximately the limit of resolution of the data base. The programs generate the total population within selected distances and angular sectors from a reference point designated by its geographic coordinates. Alternately, the programs can be used as subroutines to make available to another program the distance and bearing of each CED, in a selected region, from a reference point. The potential applications to the population exposure problem are many and examples briefly discussed include single-source discharge from facilities in the nuclear fuel cycle and exposure from nonionizing radiation sources such as radio, television, radar, and microwave transmitters. An an example of the use of this population distribution system, the population exposure from AM radio standard broadcast station is discussed in detail. (See also W75-04152) (Houser-ORNL)
W75-04157

THE USE OF ENVIRONMENTAL MONITORING DATA IN DETERMINING BACKGROUND RADIATION DOSES,
Health Physics Society, East Weymouth, Mass.
S. M. Garry, W. H. Wilkie, B. B. Hobbs, H. J. Monroe, and R. G. Wallace.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 37-44, 3 tab, 13 ref.

Descriptors: *Nuclear powerplants, *Radioactivity, *Measurement, *Assessment, Background radiation, Monitoring, Environment, Air pollution, Water pollution, Soil contamination, Food chains, Path of pollutants, Gamma rays.
Identifiers: *Doses, *Population exposure, Cosmic radiation.

Comparison of background radiation doses reported in the literature with doses calculated from preoperational environmental monitoring data indicates in general, that monitoring data can be used to estimate doses to individuals from background radiation. These procedures for estimating doses provide a basis for assessing any significant increase in dose that may result from the operation of a nuclear power plant. Doses to individuals from background radiation are estimated from preoperational environmental monitoring data for a nuclear power plant. Food categories, consumption rates, and dose commitment factors are listed; and the calculation of doses to individuals from radioactivity in the environment is described. Sample collection and laboratory procedures are described briefly. Models of ingestion, air submersion, inhalation, and ground concentration pathways are used to calculate the doses from 16 radionuclides. Ingestion doses are estimated from measured radionuclide concentrations in 10 food categories that represent the major portion of the human diet. Doses from air submersion and inhalation pathways are estimated from measurements of radionuclide concentrations in air. Doses received from terrestrial radioactivity are calculated from measurements of radionuclide concentrations in soil. Thermoluminescent dosimeters are used to estimate the total external background gamma doses, including doses received from cosmic radiation. (See also W75-04152) (Houser-ORNL)
W75-04158

ENVIRONMENTAL RADIATION MEASUREMENTS USING IN SITU AND CORE SAMPLING TECHNIQUES,
Oak Ridge National Lab., Tenn.
H. W. Dickson, G. D. Kerr, P. T. Perdue, and S. A. Abdullah.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, 1974, Knoxville, Tennessee, p 45-52, 2 fig, 3 tab, 7 ref.

Descriptors: *Environment, *Radioactivity, *Measurement, *Assessment, Analytical techniques, Sampling, Cores, Instrumentation, Gamma rays, Cesium, Computer program, Soils, Soil contamination, Distribution.
Identifiers: *In-situ measurements, *Dose rate.

Dose rates from natural radionuclides and 137Cs in soils of the Oak Ridge area have been determined from in situ and core sample measurements. In situ gammaray measurements were made with a spectrometer consisting of a 4096 channel analyzer and a 55 cm3 Ge(Li) detector designed for this purpose. This equipment was transported in a mobile laboratory constructed in a large van that had a gasoline generator to provide electrical power at remote sites. A tape of spectral data and a soil core sample from each site were returned to ORNL for further analysis. Information on soil composition, density, and moisture content, and on the distribution of cesium in the soil was obtained from the core samples. Measurements of radionuclide concentrations in soil samples were made with a 4 x 4 inch NaI detector that was in a graded shield and shielded counting room. In situ spectra were analyzed by a computer program which identified and assigned energies to peaks, integrated the areas under the peaks, and calculated radionuclide concentrations based on a uniform distribution in the soil. The assumption of a uniform distribution was adequate only for natural radionuclides, but simple corrections can be made to the computer calculations for man-made radionuclides distributed on the surface or exponentially in the soil. For 137Cs, a correction was used based on an exponential function fitted to the distribution measured in core samples. At typical sites in Oak Ridge, the dose rate determined from these measurements was about 5 urad/hr. (See also W75-04152) (Houser-ORNL)
W75-04159

ENTRAINMENT OF STRATOSPHERIC TRITIUM: ANOTHER RADIOLOGICAL ANOMALY OF THE ROCKY MOUNTAIN WEST,
NUS Corp., Rockville, Md.
S. T. Bard.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 73-79, 3 fig, 2 ref.

Descriptors: Nuclear powerplants, *Radioactivity, *Monitoring, Surveys, *Tritium, Nuclear explosions, *Air pollution, Water pollution, Meteorology, Migration, *Rocky Mountain region, *Waste vapor.
Identifiers: *Surveillance program, Fort St. Vrain(Colo), Maximum permissible concentration.

A pre-operational radiological surveillance program for the Fort St. Vrain Nuclear Generating Station has detected a source of population exposure unique to the Colorado front range. It was found that tritium concentrations in atmospheric water vapor could fluctuate by three orders of magnitude over a twenty-four hour period and may attain MPC levels for short intervals of time following a high yield thermonuclear atmospheric test. The results also substantiate the work of other investigators who have suggested that orographically induced atmospheric waves can significantly alter the height of the tropopause in the lee of the mountains and allow for the rapid transport of stratospheric air to the ground suface. (See alsoW75-04152) (Houser-ORNL)
W75-04162

AS LOW AS PRACTICABLE: A CRITICAL APPRAISAL OF POPULATION HEALTH RISKS FROM POWER PLANT EFFLUENTS,
Brookhaven National Lab., Upton, N.Y.
A. P. Hull.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 161-172, 1 fig, 1 tab, 37 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Radioactivity, *Water pollution, *Air pollution, *Liquid wastes, *Public health, Food chains, Population, Assessment, Risks, Human population, Environmental effects, Mortality, Safety, Evaluation, Model studies.

A public controversy about the risks from radioactivity in effluents from nuclear power plants arose in the late 1960's as their utilization was growing toward large-scale commercial basis. Several scientific critics alleged variously that the existing plants had occasioned excess infant mortality in their vicinities, and that the growth of nuclear power would produce large increases in the cancer death rate in the general population. The controversy occasioned by these allegations led the Federal Radiation Council to instigate the Biological Effects of Ionizing Radiation (BEIR) Committee review of the effects of exposure to low levels of ionizing radiation. It also appeared to underlie the AEC's 10 CFR 50 Appendix I proposals for numerical limits for nuclear power plant effluents. These proposals are intended to limit the exposure of any nearby individual to 5 mR/yr, and thereby would assure that the total population would be exposed to less than about 400 person-rems per year per 1,000 Mw(e) installed capacity. This critical review indicates that the critics' allegations were either without substance or irrelevant. Using BEIR estimates of the risks from radiation and recent years effluent release data, the population health risk from power reactor effluent radiation exposures appears to be generally smaller than that from fossil-fueled plant effluents. The BEIR estimates are based on the linear no-threshold hypothesis. Growing evidence suggests that this hypothesis is excessively conservative, when applied to low dose levels such as those occasioned by routine nuclear power plant effluents. Insofar as this is so, the benefits of the Appendix I proposals to reduce population exposures appear to be correspondingly exaggerated. (See also W75-04152) (Houser-ORNL)
W75-04163

DETERMINATION OF GAMMA-RAY EXPOSURE IN THE VICINITY OF A BOILING WATER POWER REACTOR,
Atomic Energy Commission, New York, New York, Health and Safety Laboratory.
C. V. Gogolak, and K. M. Miller.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 207-214, 3 fig, 2 tab, 17 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Noble gases, *Meteorology, *Population, *Radioactivity, *Model studies, Measurement, Data collection, Ion transport, Analytical techniques, Operations, Evaluation, Assessment, Public health.
Identifiers: Release rate, Gaussian Models, Dose.

Calculations of gamma-ray exposure due to the noble gas effluent of a boiling water power reactor have been made using a Gaussian plume exposure model. Hourly meteorological data and daily average release rate data gathered on site were used as input to the model. Simultaneous measurements were made with continuously-monitoring ionization chambers at seven locations between 1.3 and 8.0 km from the reactor stack for more than eight months of reactor operation to evaluate the model results. Having established the reliability of the calculations for determining exposure rates lower than 1 mR per year, estimates of the population exposure to a distance of 16 km from the plant were made. Problems involved in extending such calculations to population dose assessment are discussed. (See also W75-04152) (Houser-ORNL)
W75-04168

EFFECT OF STACK HEIGHT ON INDIVIDUAL AND POPULATION DOSES ATTRIBUTABLE TO GASEOUS EFFLUENTS FROM A MODEL FUEL REPROCESSING FACILITY,
Oak Ridge National Lab., Tenn.
L. R. McKay, and J. P. Witherspoon.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 223-228, 1 tab, 10 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Radioactivity, *Gases, particles, Waste dilution, Dispersion, Population, Public health, Toxicity, Tritium, Krypton, Assessment, Safety, Evaluation, Computer models, Computer programs.
Identifiers: Dose, Fuel reprocessing, *Population exposure, *Stack height, Comparisons.

The importance of stack height to provide sufficient atmospheric dilution for radioactive particles and gases in emissions from nuclear facilities has long been recognized. To assess the influence of stack height on radiation doses attributable to gases and particles in airborn emissions from a model fuel reprocessing facility, a plant typical in terms of source term, technology, location, and surrounding population was selected. A computer code was used to predict atmospheric and ground concentrations of radionuclides out to 55 miles and to estimate dose from both external and internal exposure modes. A stack height of 100 meters was selected as the base line case, and heights of 75, 50, and 20 meters were used to estimate the effect on maximum individual dose and on population dose within 55 miles of the model facility. When a 20-meter stack height was assumed, the maximum dose to an individual was 18 times that estimated for a 100-meter stack. The corresponding population dose out to 55 miles, however, was only 1.6 times greater for the shorter stack. The maximum dose to an individual attributable to the gases tritium and krypton-85 was reduced 20-fold in increasing stack height from 20 to 100 meters. The corresponding decrease in the particulate fraction was only about 10-fold. At 55 miles, estimates of population dose varied from 668 (20-meter stack) to 414 (100-meter stack) man-rems/year. Stack height had little effect on population dose, 95% of which was attributable to the gases tritium and krypton-85. (See also W75-04152) (Houser-ORNL)
W75-04170

C-14 GASEOUS EFFLUENT FROM PRESSURIZED WATER REACTORS,
New York State Dept. of Health, Albany. Radiological Sciences Lab.
C. Kunz, W. E. Mahoney, and T. O. Miller.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p. 229-234. 2 tab, 8 ref.

Descriptors: Industrial production, *Nuclear powerplants, *Effluents, *Gases, Carbon, *Assay, Assessment, Radioactivity, Toxicity, Public health, Analytical techniques, Gas chromatography, Oxygen, Nitrogen, Neutron absorption, Ecology.
Identifiers: *Carbon-14 gases.

Samples of decay tank gas and containment air were obtained from the three operating pressurized water reactors in New York State: the Ginna reactor in Rochester and Indian Point Unit 1 and Indian Point Unit 2 in Buchanan. These samples, taken over the past two years, were analyzed for carbon species by chromatographic separation. The 14C activity of the individual compounds was measured by gas proportional counting. In all the samples analyzed, CH4 and C2H6 contained over 80% of the 14C activity, with lesser activities observed for higher hydrocarbons and CO2. Although the fission product activity in gaseous effluents varied with fuel rod integrity, the production of 14C remained relatively constant. The results indicate that it is produced predominantly in the reactor vessel by the reaction of neutrons with nitrogen and oxygen in the primary coolant. The total yearly gaseous effluent of 14C for a 1,000 MWe pressurized water reactor is estimated to be approximately 6 Ci. (See also W75-04152) (Houser-ORNL)
W75-04171

MEASUREMENT OF ABSORBED FRACTIONS FOR PHOTON SOURCES DISTRIBUTED UNIFORMLY IN VARIOUS ORGANS OF A HETEROGENEOUS PHANTOM,
Oak Ridge National Lab., Tenn.
S. M. Garry, P. S. Stanbury, and J. W. Poston.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 251-258. 2 fig, 3 tab, 10 ref.

Descriptors: Research and development, *Model studies, *Research facilities, Mathematics, *Measurement, Absorption, Radioactivity effects, Food chains, Water, Milk, Foods, Cesium, Cobalt.
Identifiers: *Dose, Phantom.

A physical representation of the Snyder-Fisher mathematical phantom has been designed and constructed. The physical phantom contains skeletal components, lungs, and soft-tissue regions similar to the mathematical Snyder-Fisher phantom. The phantom is suitable for studies of radiation distributions involving both internally and externally applied radiation fields. The phantom and its composition are described. Dose distributions were measured within the phantom resulting from photon emitters distributed uniformly in selected organs. These distributions were used to calculate absorbed fractions for the mathematically defined phantom organs. These absorbed fractions are given and compared with the absorbed fraction estimates by Snyder, et al. In general, estimates of the absorbed fractions, obtained experimentally, fall within the range of twice the standard deviation of the calculated value. (See also W75-04152) (Houser-ORNL)
W75-04173

DECAY SCHEME DATA FOR RADIATION DOSE CALCULATIONS,
National Environmental Research Center, Las Vegas, Nev.
B. J. Mann.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 259-266. 1 fig, 1 tab, 14 ref.

Descriptors: Nuclear powerplants, Effluents, *Radioactivity, Radioactivity effects, *Human population, Toxicity, Public health, Safety, Evaluation, Radioisotopes, Research and development, Research facilities.
Identifiers: *Dose calculations, Decay schemes.

Safety and environmental impact assessments of nuclear projects include calculations of expected radiation doses to individuals and population groups under a variety of circumstances. These calculations require detailed decay data from all individual radionuclides of interest. These data include half-lives or decay constants, decay modes and branching ratios, and energies and absolute intensities of all radiation emitted. A compilation of radiation energies and absolute intensities from the decay of radionuclides produced in light water power reactors has been initiated. This is primarily based on data provided by the Lawrence Berkeley Table of Isotopes Project and, to a lesser extent, on the publications of the Oak Ridge Nuclear Data Project. This effort has encountered a number of difficulties in development of a complete file of the best values for each of the decay parameters. These Problems are discussed and data needs for dose computations are examined. It is proposed that a comprehensive, computerized decay data file be developed and maintained by a qualified group or organization. (See also W75-04152) (Houser-ORNL)
W75-04174

THE EFFECT OF DEPOSITION VELOCITIES ON ESTIMATES OF ENVIRONMENTAL TRANSPORT AND POPULATION DOSES,
Oak Ridge National Lab., Tenn.
R. E. Moore, and S. V. Kaye.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 283-288. 2 tab, 6 ref.

Descriptors: *Nuclear powerplants, Nuclear reactors, *Effluents, *Environment, Meteorology, *Ion transport, *Radioactivity, Assessment, Evaluation, Velocity, Food chains, Radioisotopes, Public health, Research and development, Sites.
Identifiers: Particles, Deposition, Population exposure, Doses.

Uncertainties in values used for deposition velocities of particulate radionuclides released to the atmosphere by nuclear facilities have led to uncertainties in estimated population doses. A computer study of 33 radionuclides, assumed to be released as particles from a liquid metal fast breeder reactor (LMFBR) fuel reprocessing plant, was designed to evaluate the sensitivity of estimated doses to selected values for deposition velocities. Deposition velocities were varied from 0.1 to 10 cm/sec, which is approximately the range found in the literature for the few measurements that have been reported. Atmospheric dispersion from a 100-meter stack was estimated for the average annual meteorological conditions of 18 reactor sites in the United States. A uniform population distribution within a 50-mile radius of the plant was assumed. Increasing the deposition velocity increases the dose through ingestion of food produced in the area and the dose through exposure to contaminated land surfaces, but decreases the inhalation and immersion doses. The deposition velocity for each radionuclide was determined to give the average of the minimum and maximum doses (for whole body and for reference organs) computed over the range of deposition velocities used in this

study. Nearly all of the values fall within the range 0.7 to 1.35 cm/sec, with most close to 1 cm/sec. The use of these values assures that doses would not be underestimated by more than 50%. The uncertainties for whole body dose range from plus or minus 4 to plus or minus 99%; the majority is greater than plus or minus 80%. Uncertainty limits for a total facility release can be assigned by weighting dose uncertainties for the specific radionuclides by their release rates to the environment. (See also W75-04152) (Houser-ORNL)
W75-04177

LOW LEVEL POPULATION EXPOSURE MEASUREMENTS USING THERMOLUMINESCENT DOSIMETERS,
Eastern Environmental Radiation Facility, Montgomery, Ala.
J. E. Partridge, J. A. Broadway, S. T. Windham, and C. R. Phillips.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 289-296. 4 fig, 2 tab, 7 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Radioactivity, Measurement, *Assay, Assessment, Human population, On-site data collections, On-site investigations, On-site tests, Evaluation, Standards, Instrumentation, Meteorology.
Identifiers: *Dosimetry, *Population exposure, Thermoluminescence dosimetry, Stack releases.

The Eastern Environmental Radiation Facility's (EPA) experience with calcium fluoride:manganese thermoluminescent dosimeters (TLD) is described. The information gained from earlier laboratory studies was applied to a thorough field evaluation of this type dosimeter. The objective of this field evaluation was to determine the usefulness of this TLD for making population exposure measurements in the range of proposed 10CFR50, Appendix I, limits. The results of a ten month investigation at an operating boiling water reactor site are given. Simultaneous TLD and pressurized ionization chamber measurements were made at several locations near the site boundary for the length of the study. The integrated exposure as recorded by the TLD is compared with the results obtained using ionization chambers. The TLD measurements are also compared to mathematical predictions for each site. The mathematical predictions were made using the AIREM code and plant supplied stack release and meteorological data. (See also W75-04152) (Houser-ORNL)
W75-04178

FIELD TESTING OF TSEE DOSIMETERS FOR PERSONNEL MONITORING,
Oak Ridge National Lab., Tenn.
R. B. Gammage, J. S. Cheka, and N. Saheli.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 297-304. 4 fig, 3 tab, 11 ref.

Descriptors: *Monitoring, *On-site tests, *Instrumentation, *Radioactivity, On-site data collections, Evaluation, Assessment, Research and development.
Identifiers: *Dosimeters, *Dosimetry, Personnel monitoring, Comparison, Ion chamber, Film, Thermoluminescence.

Generally successful field tests using thermally stimulated exoelectron emitting (TSEE) type dosimeters for personnel monitoring have been conducted for periods of between one day and one year and at exposures of gamma radiation ranging from essentially background level to about 100 mR/day. Performance is less satisfactory during the hottest and most humid weather of the year in Tennessee when fading is significant during three-month long exposures. Comparison with data from film, TLD and ionization chambers is satisfactory taking into account the variety of filter and absorber thicknesses used. A superior performance by the TSEE dosimeters is indicated where weaker penetrating radiations are present. The energy and angular dependence characteristics are very favorable for the purposes of X- and y-ray dosimetry. For the task of personnel monitoring, the following have been developed: a manual reader with good reproducibility for semi-routine use, a lightproof badge, and sensitive but stable BeO ceramic dosimeters. (See also W75-04152) (Houser-ORNL)
W75-04179

COMPARATIVE POPULATION RADIATION DOSE COMMITMENTS OF NUCLEAR AND FOSSIL FUEL ELECTRIC POWER CYCLES,
Office of Radiation Programs, Washington, D.C.
For primary bibliographic entry see Field 5C.
W75-04181

POPULATION EXPOSURE FROM HIGH-ENERGY ACCELERATORS,
California Univ., Berkeley. Lawrence Berkeley Lab.
For primary bibliographic entry see Field 5C.
W75-04183

ESTIMATION OF THE DOSE EQUIVALENT TO THE U.S. POPULATION FROM RADON IN LIQUIFIED PETROLEUM GAS,
Texas Univ., Houston. School of Public Health.
T. F. Gessell.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 347-354, 3 tab, 15 ref.

Descriptors: *Radioactivity, *Measurement, *Radon, *Gases, *Natural Gas, *Human population, Public health, Estimating.
Identifiers: Doses, Estimating, Population exposure, Demography, Census, Dosimetry.

Previous publications of the radiological health aspects of 222Rn in liquified petroleum gas (LPG) have reported measurements of 222Rn concentrations in LPG at the consumer level in 14 states and estimates of the resulting dose equivalents to the bronchial epithelium of individuals under hypothetical circumstances. In this paper the measured 222Rn concentrations in LPG are incorporated with information on the production and distribution of LPG to estimate an average 222Rn concentration in LPG for each state. These estimates, together with weather, demographic, and LPG consumption data are used to estimate the population dose equivalent to the bronchial epithelium of the general population from this source of 222Rn. The results are compared with the estimated population dose equivalent due to 222Rn in natural gas and due to 222Rn present naturally in the atmosphere. (See also W75-04152) (Houser-ORNL)
W75-04184

RADIATION DOSE FROM NATURAL GAS VS. THAT FROM NUCLEAR STIMULATED NATURAL GAS,
Georgia Inst. of Tech., Atlanta. Office of Interdisciplinary Programs.
M. W. Carter, and A. A. Moghissi.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 355-360, 1 tab, 10 ref.

Descriptors: *Radioactivity, *Radiation, *Radon, *Gases, *Tritium, *Krypton, Natural resources, *Natural gas, Consumptive use, Human population, Public health, Secondary recovery(Oil).

Natural gas contains radon and its daughter products which contribute to the population dose. Nuclear stimulated gas may also contain tritium and krypton-85 as contaminants. It is possible to compare radiation dose from radon with that from tritium and krypton-85 using various methods. Results are described of such a comparison based on previous experiments with tritiated natural gas. (See also W75-04152) (Houser-ORNL)
W75-04185

LARGE SCALE NUCLEAR GAS STIMULATION: POPULATION DOSES ESTIMATED IN THE ENVIRONMENTAL ASSESSMENT OF CARBON-14 RELEASES,
Oak Ridge National Lab., Tenn.
P. S. Rohwer, C. J. Barton, and R. E. Moore.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 361-368, 1 tab, 15 ref.

Descriptors: *Secondary recovery(Oil), *Natural gas, *Radioactivity, *Radioisotopes, *Nuclear explosions, Carbon, Environment, Pollutants, Estimates, Assessment, Human population, Public health, Fossil fuels.
Identifiers: *Doses, *Carbon-14.

Carbon-14 is present principally as 14CO2 and 14CH4 in natural gas from wells stimulated with nuclear explosives. The 14CO2 probably would be removed and released to the atmosphere at a processing plant before the gas is introduced into a transmission system supplying users. The 14C present as 14CH4 and other 14C hydrocarbons will be released, also as 14CO2, at the point of gas combustion. The hypothetical situation considered is a model field of 1200 nuclearly stimulated wells developed over a 30-year period, each well releasing ultimately 2 Ci of 14C as 14CO2. Doses to individual gas users, to a local population, and to the world population were estimated. Inhalation of 14CO2 in home exposure to gas combustion products from an unvented kitchen range is estimated to result in an annual total-body dose to the resident of 0.005 millirem. The annual population dose due to 14CO2 inhalation estimated for 1.42 million people living within 50 miles of a gas processing plant is 0.06 man-rem, with a maximum individual dose of 0.01 millirem and an average of 0.00004 millirem. Assuming zero population growth, the resulting population dose commitment is 120 man-rems for the entire world. These estimated population dose commitments are shown to be less than 10% of the population doses received annually from natural 14C. The present rate of burning 14C-free fossil fuels results in a theoretical annual reduction in the specific activity of 14CO2 in the troposphere (Suess Effect) that is approximately 100 times larger than the calculated increase from annual development of 40 new nuclearly stimulated wells. (See also W75-04152) (Houser-ORNL)
W75-04186

PHILOSOPHY AND METHODOLOGY OF ASSESSMENT OF RADIATION DOSES TO POPULATIONS FROM COMBUSTION PRODUCTS OF PLOWSHARE NATURAL GAS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5C.
W75-04187

EXPOSURES TO FIVE TARGET HEALTH HAZARDS,
Occupational Safety and Health Administration, Washington, D.C.
F. H. Ryer.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 389-394.

Descriptors: *Public health, *Hazards, *Toxins, *Toxicity, *Measurement, Pollutants, Bioassay, Pathology, Lead, Inhibitors, Control, Asbestos,

Cotton, Dusts, Carbon, Gases, Silica, On-site data collections, Air pollution, Water pollution.
Identifiers: Cotton dusts, Carbon monoxide.

A target health hazards program (THHP) initiated in January 1972 by the Occupational Safety and Health Administration, is described. The five substances singled out as target health hazards (asbestos, cotton dust, carbon monoxide, lead, and silica) are discussed in detail. The exposure potential is given for each substance as well as the method for measuring the concentration in air. Optimum measures for controlling or preventing each hazard are given. The number of inspections made in workplaces from the time of program inception to date is presented. In addition, the number of employees affected in THHP inspections, the number of measurements made of exposures, the number of samples taken, and the severity of exposures for each hazard are given. (See also W75-04152) (Houser-ORNL)
W75-04190

BIOMEDICAL EVALUATION OF LOW FREQUENCY (LONG WAVE) ELECTROMAGNETIC RADIATION ASSOCIATED WITH ELECTRIC POWER TRANSMISSION,
Illinois Univ. Medical Center, Chicago, Ill. School of Public Health.
For primary bibliographic entry see Field 5C.
W75-04191

AN EXAMINATION OF DESIGN PARAMETERS IN A FIELD STUDY FOR EXPOSURE EVALUATION,
Eastern Environmental Radiation Facility, Montgomery, Ala.
J. A. Broadway, J. E. Partridge, S. T. Windham, and C. R. Phillips.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 405-410, 1 fig, 2 tab, 4 ref.

Descriptors: *Monitoring, *Measurement, *Radioactivity, *Effluents, *Nuclear powerplants, Evaluation, On-site tests, Investigations, Design criteria, Predictions, Forecasting, Xenon, Public health.
Identifiers: *Population exposure.

Continuous exposure measurements over several months in the vicinity of an operating boiling water nuclear power reactor (BWR) plant and corresponding predictions for exposure during the same time period have been examined by several statistical tests. The purpose of these tests has been to quantitate parameters important in the experimental design of such investigations. Conclusions regarding the length of such studies and the number of field measurement sites required are presented. Field measurement of ground-level 133Xe gaseous concentration has been compared with predicted concentrations. Implications regarding the conversion from atmospheric concentration to exposure rates are discussed. Overall implications regarding the design of other such field studies are presented. The Eastern Environmental Radiation Facility (EERF) has conducted a field study in the vicinity of an operating boiling water reactor. Results from a validation study for an atmospheric dispersion code (AIREM) developed by the Office of Radiation Programs have been reported previously. The present investigation was performed to analyze these results for implications important in the experimental design of similar such studies. Standard statistical tests have been employed to aid decision making to maximize the productivity while minimizing redundancy and cost involved in field studies. (See also W75-04152) (Houser-ORNL)
W75-04192

POPULATION EXPOSURE TO NATURAL TERRESTRIAL GAMMA RADIATION AROUND SELECTED NUCLEAR POWER PLANT SITES,
EG and G, Inc., Las Vegas, Nev.
Z. G. Burson.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 411-420, 3 fig, 3 tab, 10 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Air pollution, *Water pollution, *Measurement, Public health, Surveys, Remote sensing, On-site tests, Sites, Environment, Soil contamination, Fallout, Population, Distribution, Solar radiation, Background radiation.
Identifiers: *Population exposure, *Dose rates.

The average dose rates from external penetrating natural terrestrial gamma radiation have been determined from airborne survey data for specific areas surrounding each of 20 nuclear power plants. This dose rate information has been combined with population distribution data to obtain the average tissue dose-equivalent rate per person. This evaluation covers 19,400 square miles, inhabited by 4.4 million people. Average dose-equivalent rates ranged from a low of 18 mrem/yr at Oyster Creek to 113 mrem/yr at Fort St Vrain. For 18 sites in the Northeastern and North-central United States the mean terrestrial dose-equivalent rate per capita was 46 mrem/yr, while the average without regard to population distribution was 43 mrem/yr. In comparison, cosmic ray levels for the 18 sites range from 29 to 32 mrem/yr for elevations from 0 to 1200 ft above sea level. (See also W75-04152) (Houser-ORNL)
W75-04193

ASSESSMENT OF PUBLIC RADIATION EXPOSURE IN THE VICINITY OF U.S. AEC SITES,
Division of Operational Safety (AEC), Washington, D.C.
C. G. Welty, Jr., and M. W. Tiernan.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 421-428, 1 fig, 8 tab, 6 ref.

Descriptors: *Monitoring, Environment, *Surveys, *Measurement, *Sites, *Radioactivity, Regulation, Standards, Public Health, Operations, On-site tests, Investigations, Path of pollutants, Effluents, Meteorology, Dispersion, Air pollution, Water pollution, Soil contamination, Human population.
Identifiers: Dose, *Population exposure.

There are 27 major AEC sites in the United States which handle or process radioactive materials in quantities to warrant the maintenance of a routine environmental monitoring and reporting program. In 1972 as part of this routine program, these sites made an annual assessment of the radiation dose to the public which could have resulted from operations conducted at the site. Actual measurements of radioactivity in the pathways of exposure close to man are used whenever possible, although for certain nuclides, like noble gases, estimates of dose are normally made using effluent and meteorological data, and appropriate dispersion equations. Estimates include (1) site boundary dose rates, (2) population dose, and (3) the whole-body 80 kilometer man-rem population dose. In 1973 estimated whole-body dose rates near the boundary of AEC sites ranged from less than 1 to about 30 mrem per year, or from less than 1 to about 6 percent of the radiation protection standard for an individual. The doses are dependent on the types of operations conducted at the particular site and often on the size of the site itself. The 80 kilometer man-rem estimates for all AEC sites ranged from less than 1 to about 195 man-rem per year, the maximum due primarily to tritium. (See also W75-04152) (Houser-ORNL)
W75-04194

MATHEMATICAL MODELLING AND IDENTIFICATION OF THERMAL POLLUTION IN STREAMS: A REVIEW PAPER,
Case Western Reserve Univ., Cleveland, Ohio. Systems Engineering Div.
For primary bibliographic entry see Field 5B.
W75-04230

DATA COLLECTION AND ANALYSIS TECHNIQUES FOR GLOBAL MARINE POLLUTION STUDIES,
Department of the Environment, Ottawa, (Ontario). Marine Sciences Directorate.
T. S. Murty.
In: Water For the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 295-306. 5 fig, 4 ref.

Descriptors: *Water pollution, *Oceans, *Pollutants, Water quality, *Data collections, Programs, Investigations, *Monitoring, Water quality standards, On-site investigations, Oceanography, Canada, United States, Foreign countries.
Identifiers: Sweden, Japan, Netherlands, France, United Kingdom, Federal Republic of Germany, Denmark, USSR.

The marine pollution monitoring programs of ten nations involved in major efforts in oceanography were briefly reviewed. Information was presented on the physical and chemical parameters that are routinely monitored in support of pollution and fisheries problems. The methods of analyses were briefly discussed and some examples of products were included. (See also W75-04213) (Humphreys-ISWS)
W75-04236

A SURVEY OF ORGANIC CARBON CONSTITUENTS IN NATURAL FRESH WATERS,
Minnesota Univ., Minneapolis. Dept. of Civil Engineering and Hydraulics.
For primary bibliographic entry see Field 5B.
W75-04252

INTERACTION OF BULK PRECIPITATION, STREAM WATER, AND SEWAGE IN A SMALL WATERSHED NEAR OXFORD, MISSISSIPPI,
Mississippi Univ., University. Dept. of Geology and Geological Engineering.
For primary bibliographic entry see Field 5B.
W75-04254

DEVELOPMENT OF A PROTOTYPE AIRBORNE OIL SURVEILLANCE SYSTEM - VOLUME I - SYSTEM DEFINITIONS STUDIES.
Aerojet Electrosystems Co., Azusa, Calif.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-779 482, $8.50 in paper copy, $2.25 in microfiche. Report No. CG-D-45-74, June 1973. 257 p, 68 fig, 35 tab, 21 ref, 1 append. DOT-CG-22,170-A.

Descriptors: *Monitoring, *Oil spills, *Remote sensing, Aircraft, *Mapping, *Instrumentation, *Radar, Measurement, Electronic equipment, Cameras, Oil pollution, Microwaves, *Infrared radiation, Regulation, Data processing, Evaluation, Surveys, Radio waves, Environment, Oceans, Weather, Telemetry, Tracking techniques.
Identifiers: Low light level television.

Details were provided of the prototype Airborne Oil Surveillance System (AOSS) design. The AOSS is a multisensor airborborne surveillance system configured to assist the Coast Guard in enforcement of antipollution legislation and assessment/clean-up of accidental spills. The surveillance system consists of (1) an X-band sidelooking

radar system for long-range ship detection and adverse weather oil spill mapping; (2) a 37 GHz passive microwave imaging system for adverse weather spill mapping and spill thickness approximation; (3) multispectral low light level TV system for spill identification, high resolution documentation, and violator identification; (4) a multichannel infrared line scanner for spill identification and discrimination; (5) a position reference system for legal and operational effectiveness; and (6) a real-time processor/display console for maximum operational effectiveness. (Humphreys-ISWS)
W75-04259

EXPERIMENTAL DATA FOR HYGIENIC STANDARDIZATION OF DIHYDROPEROXIDE META-DIISOPROPYLBENZE IN SURFACE WATERS, (IN RUSSIAN),
Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 5C.
W75-04319

5B. Sources Of Pollution

PREDICTION OF RADIOISOTOPE CONCENTRATIONS IN FRESHWATER STREAMS,
Michigan State Univ., East Lansing. Dept. of Fisheries and Wildlife.
J. G. Seelye, and N. R. Kevern.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-238 892, $5.25 in paper copy, $2.25 in microfiche. Technical Report No 42, Institute of Water Research, Michigan State University, East Lansing, December 1974; PhD thesis. 120 p, 26 fig, 28 tab, 34 ref, 2 append. OWRT A-075-MICH(1). 14-31-0001-4022.

Descriptors: *Radioisotopes, Aquatic life, Ponds, Hazards, Zooplankton, Sediments, Fish, Stable isotopes, *Forecasting, Alkalinity, Dissolved oxygen, Hardness(Water), *Cesium, *Zinc radioisotopes, *Path of pollutants.
Identifiers: Isotope additions, 512 channel spectrometers, Sodium iodide, Thallium activated detectors, Alkalinity, Total solids, pH measurements, Diurnal oxygen measurements, Oxygen-temperature monitoring, Cs134, Zn65, Isotope transfer, *Specific activity concept.

Predictions of radioisotope concentrations in components of aquatic systems have been attempted using the specific activity concept, an approach that seems theoretically sound. A comprehensive examination of the specific activities of 134 Cs and 65Zn in the components of a freshwater system, over a 10 month period, was conducted to evaluate the specific activity hypothesis under applied conditions. This study was designed to provide comparisons of predicted and observed specific activities and to test the equivalence of specific activities between all components of the system. Four ponds were used. A prediction of specific activities was made using Pond 1 data. The distribution of stable Cs and Zn throughout the system was determined and predictions of specific activities, based on these distributions were made. The other three ponds served as controls or provided observed specific activities. Radioisotopes of Cs and Zn were added to the system and after a period of equilibration comparisons were made between predicted and observed specific activities in the water, zooplankton, fish, plants, and sediment. In all cases observed specific activities for both 134Cs and 65Zn were significantly different between components of the systems at the end of the study period. Predicted 134Cs and 65Zn concentrations were lower than observed concentrations for fish from Pond 1. This nonconservativeness is important where hazard assessments are being made. Problems with statistical comparisons of derived variables are discussed and considered in interpreting the results.
W75-03852

CONTROL METHODS FOR WASTE WATERS AND SOLUTIONS OF SPECIFIC SUBSTANCES (METODI DI CONTROLLO DI ACQUE DI SCARICO E SOLUZIONI DI SOSTANZE SPECIFICHE),
Stazione Sperimentale per la Cellulosa, Carta e Fibre Tessili Vegetali ed Artificiali, Milano (Italy).
L. d'Angiuro, and L. Vicini.
Industria della Carta, Vol 11, No 8/9, p 329-335, Aug-Sep, 1973. 3 fig, 7 tab, 12 ref. English summary.

Descriptors: *Pulp wastes, *Organic loading, *Water pollution sources, *Industrial wastes, *Chemical wastes, Discharge(Water), Waste water(Pollution), Organic compounds, Additives, Pulp and paper industry, Oxygen demand, Biochemical oxygen demand, Chemical oxygen demand, Surface tension, Polymers, Cellulose, Proteins.
Identifiers: Permanganate number, Carboxymethylcellulose, Cellulose ethers, Cellulose derivatives, Polyacrylic acid, Amides, Polyvinyl alcohol, Casein.

Studies are reported on measurements of the surface tension, permanganate-number, oxygen consumption, COD, and BOD of solutions of carboxymethylcellulose, polyacrylic acid, a degraded amide, casein, and polyvinyl alcohol in order to assess the pollution loads caused by these compounds when used as papermaking additives and discharged into waste-receiving waters. (Speckhard-IPC)
W75-03885

ACETYLENE REDUCTION (NITROGEN FIXATION) BY PULP AND PAPER MILL EFFLUENTS AND BY KLEBSIELLA ISOLATED FROM EFFLUENTS AND ENVIRONMENTAL SITUATIONS,
McGill Univ., Ste. Anne de Belleire (Quebec).
R. Knowles, R. Neufeld, and S. Simpson.
Applied Microbiology, Vol 28, No 4, p 608-613, October, 1974. 3 fig, 3 tab, 20 ref.

Descriptors: *Pulp wastes, *Nitrogen fixation, *Nitrogen fixing bacteria, Aerobic conditions, Anaerobic conditions, Azotobacter, Industrial wastes, Natural streams, Rivers, Lakes, Drainage systems, Sewage effluents, Microbial degradation, Water pollution sources, Wastes, Aquatic microorganisms, Aquatic bacteria.
Identifiers: Woodroom(Pulp mill), Acetylene, Bacillus, Klebsiella.

High rates of acetylene reduction (nitrogenase activity) were observed in woodroom effluent from a neutral sulfite semichemical pulp mill under aerobic and anaerobic conditions. Under aerobic conditions up to 644 nanomoles of acetylene/ml/hr were produced, while under anaerobic conditions the rate was up to 135 nanomoles of acetylene/ml/hr. Pasteurized effluent developed acetylene reduction activity when incubated under anaerobic but not under aerobic conditions. Activities were increased by the addition of 0.5-3.0% glucose or xylose. Enrichment and enumeration studies showed that nitrogen-fixing Azotobacter and Klebsiella were abundant, and nitrogen-fixing Bacillus was present. Of 129 isolates of Klebsiella from pulp mills, lakes, rivers, and drainage and sewage systems, 32% possessed nitrogen-fixing ability. (Witt-IPC)
W75-03892

AN ALARMING SYSTEM FOR HIGH-SOLIDS WHITE WATER,
For primary bibliographic entry see Field 5G.
W75-03901

WATER POLLUTION AND CONTROL,
Rivers House, Glasgow, (Scotland).
G. A. Best.
Journal of the Society of Dyers and Colourists, Vol 90, No 11, p 389-393, November, 1974. 4 tab, 16 ref.

Descriptors: *Textiles, *Water pollution control, *Legislation, *Water quality standards, Waste water disposal, Governments, Water pollution sources, Waste water treatment, Water pollution, Financing, Industries, Effluents, Bleaching wastes, Biological treatment, Water treatment, Water sources, Rivers, Europe, Pollution abatement, Waste treatment.
Identifiers: *Scotland.

The demand for clean water for industry and for domestic supply is increasing yearly. Many readily accessible supplies are fully exploited, and water authorities must now consider hitherto polluted rivers as possible future water sources. To meet the demand for clean water and for cleaner rivers which receive waste discharges, considerable expenditures will be required from both central and local governments and from industry for new water treatment plants. Legislation covering river pollution and waste water disposal in Scotland is described, and the particular problem of effluents from the textile industry is discussed. Previous studies have demonstrated that waste water from the textile industry can be treated by conventional biological and other techniques and be purified sufficiently to meet national and local water quality standards. (Witt-IPC)
W75-03915

KINETICS OF MICROBIOLOGICALLY MEDIATED TRANSFORMATIONS OF HEAVY METALS IN AQUATIC ENVIRONMENTS,
Cornell Univ., Ithaca, N.Y. Dept. of Environmental Engineering.
A. W. Lawrence.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 148, $3.25 in paper copy, $2.25 in microfiche. Completion Report, (1974). 12 p, 54 ref. OWRT A-038-NY(2), 14-31-0001-3532, 3832, 4032.

Descriptors: *Heavy metals, *Aquatic environment, *Water quality, *Management, *Mercury, *Zinc, *Wastes, Research, Environmental effects, Kinetics, Anaerobic conditions, Aerobic conditions, Waste water treatment, Toxicity, Reverse osmosis, Bibliographies, Environmental engineering.
Identifiers: Heavy metal removal, Metal finishing wastes, Biological sludges.

Research project accomplishments, and application of the results, are presented from a study to investigate the fate of heavy metals in the aquatic environment for purposes of developing quantitative models for engineering management of water quality. Mercury, the subject of recent intense interest, was studied first. Primary emphasis was placed on determining the kinetics of microbially mediated transformation of mercury under both aerobic and anaerobic conditions. In the latter phase of the project, a literature review was conducted on the process methodology of removal of metals other than mercury from aqueous wastes prior to environmental release. Results of this review are useful in estimating the potential problems associated with metals other than mercury. Also, an experimental study on the fate of zinc-enriched biological sludges in an aquatic environment was performed. Zinc was selected for this final study because it does not appear to be microbially transformed as is mercury and thus may represent a second pathway for metal distribution of immobilization in aquatic systems. (Bell-Cornell)
W75-03945

EFFECT OF SULFURIC ACID AND SULFUR DIOXIDE ON THE AGGREGATE STABILITY OF CALCAREOUS SOILS,
UArizona Univ., Tucson Dept. of Soils, Water and Engineering.

For primary bibliographic entry see Field 2G.
W75-03952

NITROGEN FIXATION BY BLUE-GREEN ALGAE-LICHEN CRUSTS IN THE GREAT BASIN DESERT,
Utah State Univ., Logan. Dept. of Soil Biochemistry and Microbiology.
R. C. Rychert, and J. Skujins.
Soil Science Society of American Proceedings, Vol. 38, No. 5, September-October, 1974. p 768-771, 3 tab, 5 fig, 17 ref.

Descriptors: *Deserts, *Nitrogen fixation, *Nitrogen, *Moisture availability, Shrubs, Temperature, Light, Ecosystems, Moisture, Arid climates, *Cyanophyta.
Identifiers: Blue-green algae-lichen crusts, Water potential.

The nitrogen fixation process of blue-green algaelichen in a desert ecosystem was examined. The acetylene reduction technique was used to measure nitrogen fixation under field conditions which were then compared to laboratory nitrogen fixation potentials. The blue-green algae crusts were forced to have a laboratory potential for nitrogen fixation ranging from 75 to 84 percent of N fixed ha -1/hour -l. Peak values in the field were only 13 to 18 percent of these values. Prediction is possible based on temperature during fall and rainy seasons when light and moisture are generally not limited. During the hot, dry months, moisture limits nitrogen fixation. Nitrogen fixation was reduced under desert shrub canopies possibly as a result of alleopathic effects by the shrubs. Despite the many factors limiting nitrogen fixation, blue-green algae-lichen crusts are an important aspect of nitrogen input into the desert shrub ecosystem. (Mastic-Arizona)
W75-03963

SHALLOW GROUND WATER IN SELECTED AREAS IN THE FORT UNION COAL REGION.
Geological Survey, Helena, Mont.
Open-file report, 1974. 130 p, 18 fig, 12 tab, 68 ref.

Descriptors: *Strip mines, *Montana, *North Dakota, *Wyoming, *Water pollution sources, Water levels, Hydrogeology, Water resources, Aquifers, Environmental effects.
Identifiers: Environmental impact.

Groundwater conditions and the possible effects of strip mining on shallow aquifers are considered for three priority areas in the northern Great Plains--the Gascoyne area in North Dakota, the Gillette area in Wyoming, and several subareas within the Birney-Decker area in Montana. The effects of mining will include: (1) localized disruption of the coal and overlying sandstone aquifers and loss of existing wells in the mined area; (2) drainage of clinker beds adjacent to the mined area; (3) drainage of the coal and overlying sandstone aquifers in an area around the mine; this effect will be most apparent along the strike of the beds in the immediate vicinity of the mine; (4) underlying aquifers in recharge areas should be little affected, but removal of coal and overburden might cause a small increase in upward leakage from underlying aquifers in discharge areas; (5) blasting and handling of the coal could increase nitrate and sulfate concentrations in mine waters. The most detrimental effect on the groundwater system may be contamination of the water resource by dissolved materials leached from the excavated overburden or spoils, which are used for mine backfill. Available data indicate that the leachate may contain several times more dissolved solids than water in the aquifers and also may contain harmful concentrations of trace elements, including heavy metals. (Knapp-USGS)
W75-03974

HYDROLOGIC DATA FOR 1973, BROWARD COUNTY, FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 3B.
W75-03976

LIMNOLOGICAL STUDY OF LAKE SHASTINA, SISKIYOU COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2H.
W75-03982

PRECONSTRUCTION ASSESSMENT OF BIOLOGICAL QUALITY OF THE CHENA AND LITTLE CHENA RIVERS IN THE VICINITY OF CHENA LAKES FLOOD CONTROL PROJECT NEAR FAIRBANKS, ALASKA,
Geological Survey, Anchorage, Alaska.
G. A. McCoy.
Water-Resources Investigations 29-74, November 1974. 84 p, 9 fig, 21 tab, 48 ref, 3 append.

Descriptors: *Water quality, *Rivers, *Reservoirs, *Alaska, Flood control, Dissolved oxygen, Arctic, Cold regions, Pre-impoundment, *Data collections.
Identifiers: *Chena River(Alaska).

Chemical and biological data were collected on the Chena and Little Chena Rivers, Alaska, from October 1972 through August 1973 to determine the water quality of these rivers prior to construction of the Moose Creek and Little Chena Dams. Chemical-quality measurements included conductivity, alkalinity, pH, dissolved oxygen, nitrogen and phosphorous species, dissolved iron, and biochemical and chemical oxygen demand. Biological measurements included a semiquantitative and qualitative assessment of benthic invertebrates, periphyton, and phytoplankton. The river is a typical clean-water subarctic stream with excellent water-quality characteristics. The chemical and biological water-quality constituents in the studied reach of the Chena and Little Chena Rivers are relatively uniform with the possible exception of iron and chemical oxygen demand which increase downstream. Productivity is low. The flora and fauna are diverse and characteristic of cold water streams high in dissolved oxygen and low in productivity. The construction and operation of the Moose Creek Dam probably will not appreciably alter the present water-quality conditions of the system except for possible temporary effects due to construction. (Knapp-USGS)
W75-03988

EFFECT OF SOIL MOISTURE REGIMES, PHOSPHORUS AND NITROGEN ON N AND P UPTAKE BY BARLEY (HORDEUM VULGARE L.),
Haryana Agricultural Univ., Hissar (India).
For primary bibliographic entry see Field 3F.
W75-03991

SOLID WASTE AND WATER QUALITY, (LITERATURE REVIEW),
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
J. A. Heidman, and D. R. Brunner.
Journal Water Pollution Control Federation, Vol 46, No 6, p 1315-1317, June, 1974. 20 ref.

Descriptors: *Water quality control, *Leaching, *Solid wastes, Hydrogeology, *Groundwater, Landfills, Attenuation, Waste disposal, Pesticides, Alkalinity, Nitrogen, Mercury, Cadmium, Chromium, Chemical oxygen demand, *Path of pollutants, *Bibliographies, *Reviews.
Identifiers: Leachate attenuation, Antimony, Cyanogens.

The potential for groundwater pollution resulting from the land disposal of solid wastes has been reviewed. Leachate characteristics, leachate attenuation in soil, leachate pollution problems, site evacuation methodology, and new refuse processing and disposal methods which have a potential effect on groundwater quality were examined. Solid waste disposal as related to leachate production and groundwater pollution and consideration to design of landfills for leachate control were discussed. Toxicity and solubility of hazardous solid and liquid wastes were considered. Reduction, neutralization, recovery and disposal techniques recommended for waste streams containing pesticides, CN, Hg, As, Cr, Cd and miscellaneous organic and inorganic materials and nuclear materials were examined also. The hydrogeologic factors in consideration of the situating and design of landfills under climatic conditions in northeastern Illinois were discussed. Engineering techniques effective in control of production and migration of leachate are also examined with conceptual designs for landfills in four different hydrogeologic environments. An evaluation of sanitary landfills and factors influencing leachate production was made. Soil types, groundwater flow patterns, and leachate characteristics at a landfill site in use for 5 years were examined in detail. (Leibowitz-FIRL)
W75-04016

NITRATE AND CHLORIDE ACCUMULATION AND DISTRIBUTION IN FERTILIZED TILE-DRAINED SOILS,
Minnesota Univ., St. Paul. Dept. of Soil Science.
R. G. Gast, W. W. Nelson, and J. M. MacGregor.
Journal of Environmental Quality, Vol 3, No 3, p 209-213, July-September, 1974. 5 fig, 3 tab, 9 ref.

Descriptors: *Nitrates, *Chlorides, *Soils, *Tile drains, Loam, Fertilization, Soil treatment, Denitrification, Leaching, Corn(Field), *Minnesota, Distribution.
Identifiers: Webster loam, Waldorf silty clay, Nitrate loss.

Corn studies on tile drained Webster loam in Minnesota determined that annual N application up to 70 percent greater than N removed in grain is necessary for maximum yields. The purpose of the study was to establish the relative role of N incorporation into the soil organic matter and/or loss through denitrification, downward leaching, or tile drainage in the determination of the fate of this fertilizer-N added above that removed in corn grain. Accumulation of nitrate and chloride and their distribution were determined in Webster loam and Waldorf silty clay loam profiles after long term fertilization for continuous corn crops. Concentrations in the profiles were determined at 0.3 m depth intervals and increasing distances from the tile lines. (Leibowitz-FIRL)
W75-04022

A SUMMARY AND COMPARISON OF NUTRIENTS AND RELATED WATER QUALITY IN LAKES ERIE, ONTARIO, HURON, AND SUPERIOR,
Burlington (Ontario). Canada Centre for Inland Waters.
H. F. H. Dobson, M. Gilbertson, and P. G. Sly.
Journal of the Fisheries Research Board of Canada, Vol 31, No 5, p 731-738, May, 1974. 13 fig, 7 ref.

Descriptors: *Nitrogen, *Phosphorus, *Carbon, *Nutrients, Organic matter, Dissolved oxygen, Chlorophyll, *Great Lakes, Pollutant identification, Water pollution sources.
Identifiers: *Secchi depth, Chlorophyll a, Silicon.

A summary and comparison of the nutrients and water quality of the Great Lakes was conducted, based on the presence of dissolved nutrient elements, nitrogen as nitrate and ammonia, phosphorus as inorganic phosphate or soluble

reactive phosphate, silicon as reactive silicate, carbon as inorganic carbon, dissolved organic matter, the Secchi depth, chlorophyll a, particulate phosphate, and dissolved oxygen. Related water quality is described by a simple indexing system, based on some of these parameters. (Orr-FIRL)
W75-04027

THE TOXICITY OF 2, 3, 7, 8-TETRACHLORODIBENZO-P-DIOXIN (TCDD) IN GUPPIES (POECILIA RETICULATUS PETERS),
Forest Service (USDA) Corvallis, Oreg. Forestry Sciences Lab.
For primary bibliographic entry see Field 5C.
W75-04028

THE COMPARATIVE MARINE GEOCHEMISTRIES OF LEAD 210 AND RADIUM 226,
Scripps Institution of Oceanography, La Jolla, Calif.
K. W. Bruland, M. Koide, and E. D. Goldberg.
Journal of Geophysical Research, Vol 79, No 21, p 3083-3086, July 20, 1974. 3 fig, 1 tab, 12 ref.

Descriptors: *Geochemistry, *Lead radioisotopes, *Radium radioisotopes, Sea water, Pacific Ocean, Water pollution sources, Productivity, Upwelling *Radioisotopes, Oceanography, Surface waters, Gulfs.
Identifiers: *Gulf of California.

Concentrations of 226Ra and 210Pb in the Gulf of California and eastern North Pacific seawaters are apparently governed by the extents of upwelling and the consequential biological productivities. In the highly productive Gulf of California surface water, the residence times of 226 Ra and 210 Pb are estimated at a few months and less than one month, respectively, based on the upwelling rates. (Leibowitz-FIRL)
W75-04029

SOLID WASTE DISPOSAL BY LAND BURIAL IN SOUTHERN INDIANA,
Indiana Univ., Bloomington.
D. B. Waldrip, and R. V. Ruhe.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 225, $5.25 in paper copy, $2.25 in microfiche. Purdue Univ. Water Resources Research Center, West Lafayette, Indiana, Technical Report No. 45, November 1974. 110 p, 24 fig, 32 tab, 62 ref. OWRT B-049-IND(1).

Descriptors: *Landfills, *Solid wastes, *Water quality, Surface waters, *Groundwater, Disposal, *Waste disposal, Surface runoff, Overland flow, Percolating water, Subsurface water, Perched water, Water table, *Indiana, Water pollution sources, *Path of pollutants.

Studies were made of selected landfills in Southern Indiana to determine their effect on ground and surface waters. The purpose was to define field models of the geohydrologic systems, determine ground and surface water movement, analyze changes in water quality, establish landfill criteria for protection of the water, and develop landfill site guidelines. On the three sites examined, landfill leachate was introduced into the ground and/or surface water. The level of contamination was dependent on an interrelation of the original topography, the initial soil sediment stratigraphy, the ground and surface hydrologic system, modification of the topography and stratigraphy, and nature and volume of waste. Recommendations for landfill site selection are made and include: use of upland and non-flooding areas, the highest elevation of the water table should be several feet below the base of solid wastes, underlying soil should have high exchange capacity, leachate lagoons should be used where surface runoff is a problem, rilling of soil cover, and ground water wells and surface water monitoring stations should be installed. A progress report is also presented on the organic compounds and carbon in ground water from landfill effluent. (Wiersma-Purdue)
W75-04035

SPRING AND FALL THERMAL BAR DEVELOPMENT IN LAKE SUPERIOR,
Michigan Technological Univ., Houghton. Dept. of Chemistry and Chemical Engineering.
D. W. Hubbard, and J. D. Spain.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 227, $3.25 in paper copy, $2.25 in microfiche. Completion Report, Institute of Water Research, Michigan State University, E. Lansing, December 1974. 20 p, 13 fig, 4 ref, append. OWRT A-071-MICH(1). 14-31-0001-4022.

Descriptors: Pollutants, Fluorescence, *Lake Superior, *Seasonal, *Temperature, Computer programs, *Thermometers, Measurement, Water pollution sources, Lakes.
Identifiers: Digital thermistor thermometer, *Thermal bars.

The thermal bar is a downwelling phenomenon which occurs parallel to the shore during the spring warming and the fall cooling of large temperate zone lakes. The thermal bar is of practical interest because it traps pollutants in the nearshore zone during certain seasons of the year. The fine structure of the Lake Superior thermal bar was studied during the spring and fall of 1974 with approximately 16 transects being made across the bar using a digital thermistor thermometer capable of 0.01 C accuracy in the vicinity of 4C. This equipment was designed at Michigan Technological University and represents the most accurate portable equipment available at this time. Data were plotted by computer using the SYMAP program. Natural fluorescence arising from land runoff was employed to distinguish between inshore and offshore water masses. This study has provided enough data to demonstrate that the thermal bar rivals the well-known thermocline as an agent in limiting the movement of water masses. The results suggest that the thermal bar is affected by a variety of factors such as shoreline configuration, depth, wind, bottom slope, and previous temperature history.
W75-04038

IRREVERSIBLE THERMODYNAMIC CONCEPT ON HYDROGEOCHEMICAL TRANSPORT SYSTEMS,
Nevada Univ., Reno. Desert Research Inst.
J. V. A. Sharp, and C. L. Carnahan.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 254, $3.25 in paper copy, $2.25 in microfiche. Completion Report, January, 1975. 7 p, 9 ref. OWRT A-046-NEV(2).

Descriptors: Thermodynamics, *Thermodynamic behavior, Geochemistry, *Groundwater movement, *Path of pollutants, *Energy transfer, Heat transfer.
Identifiers: *Irreversible thermodynamics.

Accurate, useful interpretation of ground-water flow systems as mobilization and transportation agents for various chemical constituents is required for better understanding of the movement of chemical parameters (and contaminants) in the subsurface. In order to develop the most accurate means of modeling a ground-water flow system, irreversible thermodynamic theory is applied. Assembling and solving mathematical expressions relating chemical and thermal potentials to velocity of ground-water flow and incorporating time- and concentration-dependent expressions for rates of various types of reactions which alter chemical and thermal potentials and concentrations of dissolved constituents are explored. Using ground water as a closed system in which energy is interchanged with its surroundings through heat transfer and also as an open system which included mass interchanges were developed. Results show that the utilization of irreversible thermodynamics provides a consistent and unifying approach to the study of simultaneous, coupled, non-equilibrium processes affecting chemical mobilization and transport in ground-water systems. (Fallon-Nevada)
W75-04041

DEGRADATION IN GROUNDWATER AND MOBILITY OF HERBICIDES,
Nebraska Univ., Lincoln. Dept. of Agronomy.
C. W. Weidner.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 242, $4.75 in paper copy, $2.25 in microfiche. M.S. Thesis, June 1974. 69 p, 9 fig, 10 tab, 55 ref. OWRT A-024-NEB(2). 14-31-0001-4027.

Descriptors: Water quality, *Groundwater, *Herbicides, *Degradation(Decomposition), *Path of pollutants, Pesticide residues.
Identifiers: Atrazine, Alachlor, Butylate, Picloram.

Laboratory studies were conducted to determine the degradation rates for atrazine, alachlor, butylate and picloram stored in groundwater. A significant amount of herbicide degradation occurred over the duration of the experiment. The rate of degradation was dependent on chemical properties of the herbicide, concentration, storage temperature and to a lesser extent the source of the water samples. Butylate showed the largest amount of degradation followed by alachlor, atrazine and picloram respectively. The 0.072 and 0.72 ppmw concentration samples result in more degradation than the 10 ppmw concentration samples. The samples stored at 25C resulted in more degradation than the samples stores at 10C. Water samples from the Clay Center location showed more herbicide degradation than the other three water sources. While herbicide degradation in groundwater did occur, the rate was much slower than would be expected for the same herbicides in a soil medium.
W75-04045

LONG TERM TRENDS IN WATER QUALITY, LOWER HAW AND NEW HOPE RIVERS - 1966-1973,
North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.
C. M. Weiss.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 232, $7.75 in paper copy, $2.25 in microfiche. North Carolina Water Resources Research Institute, Raleigh, UNC-WRRI Rept. No. 101, October 1974. 196 p, 1 fig, 14 tab, 16 ref, 3 append. OWRT A-056-NC(4). 14-01-0001-3533.

Descriptors: Water quality, *Biochemical oxygen demand, *Phosphorous, *Nitrogen, *Dissolved oxygen, *Monitoring, Forecasting, *Long-term planning, *North Carolina, Water pollution sources, Rivers.
Identifiers: Haw River(NC), New Hope River(NC).

A seven-year river sampling series of the lower Haw and New Hope Rivers, North Carolina, designed to establish their water quality profiles, has shown a level of quality generally associated with substantial pollution loads. However, in the main stem of the Haw at a point at the head of the arm of the proposed B. Everett Jordan Lake (New Hope Lake), oxygen and BOD5 quantities indicate that stabilization of oxygen-demanding materials and nitrification of nitrogenous substances have occurred. The total phosphorus concentration in the Haw River is several times that of control streams of the area and the total load of trans-

ported phosphorus (1bs/day) is approximately five times that of the New Hope River. Sharp changes in several water quality parameters were evident in a comparison of the period prior to 1970 and after 1970. These changes have been identified with an overall change in river runoff in the region, resulting from a shift in the pattern of dry to wet years. The change in water quality caused by variation in average runoff was substantial enough to mask any changes that may have occurred from variations in quantity of polluting substances introduced from upstream sources. This emphasizes the difficulty of establishing long-term trends based upon infrequent and short-term sampling series. (McJunkin-N.C. State)
W75-04046

THE DILUTION CAPACITY OF SMALL STREAMS IN SOUTH CAROLINA,
South Carolina Univ., Columbia. Dept. of Geology.
W. E. Sharp.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 231, $4.75 in paper copy, $2.25 in microfiche. South Carolina Water Resources Research Institute, Clemson, Report Number 48, September 1974. 70 p, 1 fig, 3 tab, 4 ref. OWRT A-026-SC(7).

Descriptors: *Waste dilution, Mixing, *Path of pollutants, *South Carolina, *Maps, *Streams, Statistical methods, Rivers, *Classification, Topography.
Identifiers: *Santee River(SoCar).

Topographic and stream maps may be used to make preliminary estimates of the dilution capacity of rivers and small streams. Statistical work indicates that for rivers of South Carolina both area and link magnitude (M) of rivers (map scale = 1:500,000) are excellent predictors of discharge along the length of a river basin. The expected river discharges are: maximum 242 cfs/M, mean 34.5 cfs/M and minimum 6.4 cfs/M. Good estimates of small stream discharge were much more difficult to make and are not as reliable as river discharge. The greatest uncertainty here arises from the definition of a first magnitude stream (map scale = 1:24,000) as interpreted by the map makers. The newer maps tend to show more streams than do the older maps. This effect is particularly emphasized in areas where large numbers of farm ponds have been constructed. Reasonable preliminary discharge values are: maximum 152 to 176 l/sec/M (5.65 cfs/M); mean 8.5 to 21.7 l/sec/M (0.3 to 0.77 cfs/M); minimum 0.5 l/sec/M (0.018 to 0.12 cfs/M). In small stream basins, the down stream estimate of discharge can be obtained by using a gamma distribution law.
W75-04050

A CONTINUOUS FLOW KINETIC MODEL TO PREDICT THE EFFECTS OF TEMPERATURE ON THE TOXICITY OF WASTE TO ALGAE,
Utah Water Research Lab., Logan.; and Utah State Univ., Logan. Div. of Environmental Engineering.
For primary bibliographic entry see Field 5C.
W75-04052

BIOLOGICAL AVAILABILITY OF SEDIMENT PHOSPHORUS TO MACROPHYTES,
Wisconsin Univ., Madison. Water Chemistry Program; and Wisconsin Univ., Madison. Dept. of Soil Science.
W. C. Li, D. E. Armstrong, and R. F. Harris.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 269, $3.75 paper copy, $2.25 microfiche. Wisconsin Water Resources Center, Madison, Technical Report, 1974. 26 p, 3 fig, 6 tables, 18 refs. OWRT A-040-WIS(1). 14-31-0001-3550, 14-31-0001-3850.

Descriptors: Sediments, *Phosphorus, *Lake Sediments, Nutrients, Rooted aquatic plants, *Wisconsin, *Absorption, *Nutrient removal.
Identifiers: *Myriophyllum spicatum, *Macrophytes.

The quantity of available P in selected sediments was evaluated by measurement of the amounts of P removed from sediments by Myriophyllum spicatum L. grown in columns containing sediment as the sole P source and amended with other essential nutrients. The relationships between the amount of sediment inorganic P added, the yield and P content of the plants, and the uptake of sediment inorganic P were evaluated. Available P comprised from 12.3 to 17.2% of total sediment inorganic P for the eight lake sediments investigated. Relationships between P uptake by Myriophyllum plants (microg P/g of sediment) and the total Pi, nonoccluded Pi, and Total Exch Pi contents of sediments were evaluated. Correlation coefficients were 0.99, 0.98, 0.97, respectively for the dependent variables, namely, total Pi, nonoccluded Pi, and Total Exch Pi, indicating that each of these measurements provided a good index of available P in lake sediments. However, the uptake of sediment P by Myriophyllum plants arose mainly from the nonoccluded Pi fraction (NaOH-P in calcareous sediments and NH4F-plus NaOH-P in noncalcareous sediments), and most of the exchangeable inorganic P was contained in the nonoccluded Pi fraction, indicating that available P was obtained mainly from the exchangeable inorganic P fraction.
W75-04053

NUCLEAR METEOROLOGY,
Hydrometeorological Service of the USSR, Moscow.
Available from the National Technical Information Service, Springfield, Va. 22161, as TT-74-50011, $10.60 paper copy, $2.25 microfiche. Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk 1974. 387 p, 133 fig, 100 tab, 525 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioactivity, *Nuclear explosions, *Fallout, Air pollution, Water pollution, Soil contamination, Radioactive tracers, Aerosols, Rain, Raindrops, Geophysics, Instrumentation, Measurement, Radiochemical analysis.
Identifiers: *USSR.

The All-Union Conference on Nuclear Meteorology was held on 23-28 June 1969 at the Institute of Experimental Meteorology in the town of Obinsk. The following are the main topics discussed at the Conference: (a) Utilization of radioactive tracers in meteorological investigations; (b) global contamination of the atmosphere and fallout of radioactive products of nuclear blasts; (c) natural radioactivity of the atmosphere; (d) atmospheric scavenging of radioactive contaminants; (e) formation of radioactive contamination of the environment. Other questions relating to the accumulation of radioactive products of nuclear blasts on the earth's surface were also examined. (See W75-04055 and W75-04108) (Houser-ORNL)
W75-04054

VERTICAL DISTRIBUTION OF RADIOACTIVE AEROSOLS IN THE TROPOSPHERE OVER THE EUROPEAN USSR IN 1964-1967,
L. E. Nazarov, L. A. Volokitina, Y. I. Gaziev, A. F. Kuzenkov, and S. G. Malakhov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 1-16, 3 fig, 10 tab, 10 ref.

Descriptors: *Meteorology, Nuclear energy, *Nuclear explosions, *Radon, *Aerosols, Air pollution, Distribution, Radiation, Atmosphere.
Identifiers: *Troposphere, *Stratosphere, *USSR.

Data are given on the vertical distribution of the concentration of decay products of radon and aerosol products of nuclear blasts in the troposphere over the USSR in 1964-1967. Aerosynoptic analysis of cases of considerable growth and decrease in the concentration of fission products in the ground air layer in the vicinity of Moscow established that the drift of stratospheric aerosols into the upper troposphere takes place at the tropopause discontinuity or funnel at the cyclonic periphery of the jet. At ground level the radioactive spot appears most frequently beneath the anticyclonic periphery of the jet. Examination of the simplest theoretical models of the vertical concentration distribution of fission products and short-lived decay products of radon in the troposphere yields the coefficient of vertical turbulent diffusion k(sub z) and speed of vertical ordered motion Omega, whose values are given. (See also W75-04054) (Houser-ORNL)
W75-04055

DISTRIBUTION OF FISSION PRODUCTS OVER OCEANS IN THE TROPICAL ZONE AND THEIR RELATION TO ATMOSPHERIC PROCESSES,
G. V. Dmitrieva, Y. V. Krasnopevtsev, and S. G. Malakhov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 17-28, 7 fig, 9 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioactivity, *Atmosphere, Transport, *Oceans, Pacific Ocean, Indian Ocean, Tropical cyclones, Measurement, Latitudinal studies, Tropical regions, Distribution.
Identifiers: *Fission products.

New data (for the period 1967-1968) are examined regarding the latitudinal distribution of the concentration of fission products over oceans in different regions of the tropical zone. The data show that the air at sea level in the tropical zone over the Indian Ocean and the West Pacific in the considered period is very inhomogeneous as regards the content of radioactive products. This inhomogeneity was caused by the influx in the tropical zone of air with higher radioactivity from subtropical or moderate latitudes (winter hemisphere) after the passage in these latitudes of quasimeridional cold fronts. These incursions possibly contribute sometimes also to the formation of separate zones of convergence lines in the equatorial region. Under certain synoptic conditions, the air entering the equatorial region from extratropical latitudes at times crossed the equator and could be included in the circulation of the other hemisphere. The assumption is made that, after their transformation into deep wide cyclones, Pacific typhoons can contribute to the transport of air from the southern to the northern hemisphere. (See also W75-04054) (Houser-ORNL)
W75-04056

DETERMINATION OF RADIOISOTOPE FALLOUT FROM ITS CONTENT IN CHRONOLOGICAL LAYERS OF HIGH-ALTITUDE GLACIERS,
For primary bibliographic entry see Field 5A.
W75-04057

RADIOACTIVE ISOTOPES OF EUROPIUM PRODUCED BY NUCLEAR BLASTS,
For primary bibliographic entry see Field 5A.
W75-04058

SOME CHARACTERISTICS OF UPPER CLOUDS AND SUGGESTIONS REGARDING THE UTILIZATION OF RADIOACTIVE TRACERS IN MERIDIONAL FLOWS,
For primary bibliographic entry see Field 2B.
W75-04059

MEAN AND TURBULENT TRANSFER OF SUBSTANCES OVER THE USSR,
For primary bibliographic entry see Field 2B.
W75-04060

RATE OF ATMOSPHERIC FALLOUT OF CESIUM-137 AND STRONTIUM-90 AEROSOLS,
For primary bibliographic entry see Field 5A.
W75-04061

ACCUMULATION OF STRONTIUM-90 IN SOILS,
E. B. Tyuryukanova.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 61-66, 4 fig, 4 tab, 12 ref.

Descriptors: Meteorology, Nuclear energy, *Radioisotopes, *Nuclear explosions, *Fallout, *Air pollution, *Soil contamination, *Strontium, Distribution, Assay, Soil properties, Soil types, Sands, Loam, Humus, Physicochemical properties, Geochemistry.
Identifiers: Weapons testing, USSR.

A very uneven distribution of Sr-90 is observed in the soils of the Russian Plain. The content of this radioactive nuclide in sandy soils is lower than in loamy soils, and depends on the amount of soil humus and its qualitative composition. The accumulation of Sr-90 in soils is determined both by its physiochemical composition, and by the landscape and geochemical conditions. Of great importance is the character of the runoff. In most soils Sr-90 is concentrated in the upper layer (0-5 to 0-20 cm). (See also W75-04054) (Houser-ORNL)
W75-04062

CESIUM-137, STRONTIUM-90, AND LEAD-210 IN SOIL OF THE FAR NORTH REGIONS,
M. N. Troitskaya, M. S. Ibatullin, B. Y. Litver, A. N. Nizhnikov, and P. V. Ramzaev.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 67-71, 4 tab, 4 ref.

Descriptors: Meteorology, Nuclear energy, *Nuclear explosions, Fallout, *Cesium, *Strontium, *Lead, *Radioisotopes, *Soil contamination, Geographical regions, Migration, Physicochemical properties, Permafrost, Arctic, Snow cover, Plutonium, Assay, Radioecology, Absorption.
Identifiers: Far North, USSR.

The part played by soil in the pollution of subsequent links of the chain of natural and artificial radionuclides in regions of the Far North is considered. While a geographic variation exists of the levels of artificial contamination of the soils, the ratio of cesium-137 to strontium-90 in all regions remains between 1.3 and 1.6. Experimental data are given on the mechanism governing the contamination of lichen (the main fodder of reindeer) by natural and artificial nuclides. An analysis is given of museum samples (1900-1945), indicating the absence of any connection between the high levels of lead-210 in the North and nuclear tests. The levels of plutonium-239 content in the vegetation of some regions of the Far North are determined. (See also W75-04054) (Houser-ORNL)
W75-04063

COMPARATIVE DISTRIBUTION OF STRONTIUM-90 AND CESIUM-137 IN DIFFERENT TYPES OF SOILS,
E. I. Belova, and Z. G. Antropova.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 72-75, 3 tab, 4 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioisotopes, *Fallout, *Strontium, *Cesium, Distribution, Migration, Assay, *Soil types, Soil profiles, Geochemistry, Physicochemical properties.

Results are presented of investigations into the distribution of strontium-90 and cesium-137 along the profile of five types of virgin soil 10 years after their contamination. The investigations were conducted under natural conditions on artificially contaminated plots of sod podzolic, gray forest, leached chernozem, meadow solod and solonchak soils. By the tenth year some characteristic features are observed in the distribution of the investigated radioisotopes along the profile of different types of soils. The influence of the forest cover on the migration rate and distribution of radioisotopes along the soil profile is noted. The soils are arranged in the following series according to the content of cesium-137 in the upper layer (0-4 cm): meadow solod < gray forest < solonchak < leached chernozem. The series for strontium-90 content is as follows: meadow solod < sod podzolic < solonchak < gray forest < leached chernozem. (See also W75-04054) (Houser-ORNL)
W75-04064

DISTRIBUTION AND MIGRATION OF STRONTIUM-90 IN SOILS,
L. I. Gedeonov, S. P. Rosyanov, and V. K. Vinogradova.
In:i Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 76-84, 5 fig, 4 tab, 5 ref.

Descriptors: *Radioactivity, *Fallout, *Strontium, Assay, *Soil profiles, Migration, Distribution, Soil types, Physicochemical properties, Analytical techniques, Diffusion, Radiochemical analysis, Sands, Loam.

Results are given of a study of Sr-90 distribution along soil profiles. These data can be used in an attempt to study the mechanism of Sr-90 migration in soil. Soil samples taken at depths down to 30 cm were subjected to radiochemical analysis for Sr-90. Sr-90 in 1964-1965 was mainly retained in a 15-cm soil layer. Measurable amounts of Sr-90 were found in the 25-30-cm layer. The distribution of Sr-90 along the profile of loamy soils can be described in a first approximation by a power law. Calculations with its aid show that Sr-90 penetrates deeper than 40-60 cm. The motion of radioactive fission products inside the soil cover involves a combination of different physicochemical processes in the soil, the most important of which are Sr-90 migration by diffusion and isotope migration together with the soil solution. The vertical distribution of Sr-90 in soils resulting from diffusion alone was calculated with the aid of the coefficients found. Comparison of the calculated distribution of Sr-90 with the distribution obtained by radiochemical determination of Sr-90 showed that in loamy chernozem Sr-90 migrates mainly by diffusion. In sandy sod podzolic soil this process is of the same order as the others. (See also W75-04054) (Houser-ORNL)
W75-04065

HORIZONTAL WATER MIGRATION OF STRONTIUM-90,
I. G. Vodovozova.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 85-87, 1 fig, 1 tab, 5 ref.

Descriptors: Meteorology, *Radioisotopes, *Strontium, Fallout, *Snow, *Melt water, *Assay, Movement, Cations, Migration, Soil contamination, Water pollution, Leaching, *Path of pollutants.

During spring snowmelting, radioactive strontium deposited on the earth's surface participates with melted snow in migration processes. Data are presented on the physicochemical state of strontium-90 migrating with water; 73% of strontium-90 falling with snow is in cationic form. Atmospheric precipitation is deposited in the soil, participates in the migration processes, and subsequently leaches mainly soluble strontium-90 from the soil and its proportion in cationic form in the melted snow and river water increases to 100%. Existing in an easily mobile cationic form, strontium-90 is discharged in the river together with floodwaters. (See also W75-04054) (Houser-ORNL)
W75-04066

FORMATION OF RADIOACTIVE PARTICLES DURING NUCLEAR BURSTS IN THE TROPOSPHERE,
Y. A. Izrael', and A. A. Ter-Saakov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 88-94, 8 ref.

Descriptors: Meteorology, *Nuclear energy, *Nuclear explosions, *Aerosols, *Radioisotopes, Zirconium, Lanthanum, Yttrium, Thermal radiation, Thermodynamic behavior, Equilibrium, Thermodynamics, Temperature, Sorption, Solids, Clouds, Particle size, Condensation, *Model studies.

A theoretical model of aerosol radioactivation in the fireball of a nuclear burst is examined. Formulas are derived for the distribution of the radioactivity of isotopes on the aerosol particles as a function of particle radius. Three mechanisms of particle radioactivation are treated. In the first case, condensation of radioactive isotope vapors occurs at temperatures higher than the vaporization temperature of the soil particles (approx. 2300 C), i.e., under conditions far removed from thermodynamic equilibrium. Such is the case for isotopes of zirconium, lanthanum, yttrium, and other refractory elements. In the second case the condensation of radioisotopes occurs on the surface of fused soil particles, i.e., under conditions of thermodynamic equilibrium (in the temperature range 2300-1400 C). In the third case aerosol activation is determined by radioisotope sorption on the surface of solid particles. Such is the case for isotopes which have gaseous precursors with half-decay periods from tens of seconds to several minutes (Sr-89, Sr-90, Cs-137, Ba-140). The influence of the precipitation of large particles from a cloud at the moment of radioactivation is taken into account. (See also W75-04054) (Houser-ORNL)
W75-04067

CALCULATION OF FRACTIONATION EFFECTS IN ATMOSPHERIC NUCLEAR BURSTS,
Y. A. Izrael'.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 95-100, 3 fig, 6 ref.

Descriptors: Meteorology, *Nuclear energy, *Nuclear explosions, Theoretical analysis, *Distillation, *Radioactivity effects, *Thermodynamics, Liquids, Gases, Tellerium, Strontium, Cesium, Mathematics.
Identifiers: Isotopic fractionation, Raoult's Law, Isotopic fractionation.

A theoretical calculation is given of the coefficients of fractionation of radioactive isotopes in aerosols, formed during nuclear bursts. The calculations are conducted on the assumption of thermodynamic equilibrium between the liquid and gaseous fractions with the utilization of Raoult's law. The results are given of the calculation of the fraction of radioactive isotopes of the most important mass chains condensing on the aerosols as a function of the time after the burst. Also calculated are the coefficients of fractionation fi, 95 for the isotopes Te-132, Sr-90, Sr-89, and Cs-137 in the form of functions of particle radius (the time of particle solidification is 7 sec). The calculations are performed for the nearest trace of the surface blast. The derived theoretical correlation curve of fractionation of the series of isotopes agrees satisfactorily with measurements of isotope fractionation at the nearest trace of the 'Small Boy' low-strength American nuclear explosion. (See also W75-04054) (Houser-ORNL)
W75-04068

THE ATMOSPHERIC FORMATION OF SECONDARY AEROSOLS DURING VENTILATED UNDERGROUND NUCLEAR TESTS,
V. N. Petrov, and A. A. Ter-Saakov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 101-103, 3 ref.

Descriptors: *Model studies, Meteorology, *Nuclear energy, *Nuclear explosions, Underground, *Radioactivity, Radioisotopes, Soil contamination, Air pollution, Krypton, Xenon, *Aerosols.

In underground nuclear tests, some radioactive products may be discharged into the atmosphere through excess pressure or ventilation due to the destruction of rocks in the test area and the formation of cracks near to ground level. The direct outflow into the atmosphere of nongaseous radioactive products is hardly probable, due to their sorption in the subsoil rock layer. It is therefore natural to assume that, in the main, chemically inert gases (such as the isotopes of krypton and xenon) are discharged into the atmosphere. The appearance of nonvolatile radioisotopes in the atmosphere can be associated with the decay of radioactive gases, which are the precursors of such isotopes in the corresponding chains of radioactive transformations. Nongaseous radioisotopes formed in the atmosphere are deposited on atmospheric dust particles and form so-called 'secondary' aerosols. A model of the atmospheric formation of the decay products of gaseous radioisotopes during underground nuclear tests is examined. (See also W75-04054) (Houser-ORNL)
W75-04069

SIZE DISTRIBUTION OF HIGH-ACTIVITY PARTICLES IN THE TROPOSPHERE IN SEPTEMBER-DECEMBER 1967,
Y. I. Gaziev, S. G. Malakhov, and L. E. Nazarov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 104-110, 4 fig, 1 tab, 18 ref.

Descriptors: *Meteorology, *Nuclear energy, *Nuclear explosions, Testing, *Aerosols, Radioactivity, Particle size, Distribution, Distillation, Cerium, Ruthenium, Zirconium, Stratosphere, Troposphere, Fallout.
Identifiers: *Isotopic fractionation.

High-activity particles of artificial radioactive aerosols were observed in the troposphere in September-December 1967. The 'age' of the aerosols at the beginning of the observation period was approx. 2.5 months. Radioactive particles of diameter d > or = 0.9 microns were investigated. According to the results obtained in the ground layer of the atmosphere and the upper troposphere, the integral and differential size distribution of these particles was exponential for d > or = 0.9 microns. On the average for the troposphere the exponent was equal to 1.4 plus or minus 0.2 d/micron. For radioactive particles of diameter between 2 and 6 microns, the fractionation coefficients of the isotopes Ce144, Ce141, and Ru103 were determined with respect to Zr95. The values of these coefficients were roughly the same as those given earlier in the literature for micron particles of atmospheric nuclear blasts. The time of residence in the stratosphere particles of diameter between 2.5 and 6 microns was roughly 4.5 months. The scavenging rate of radioactive particles of micron size (d = 1-6 microns) in the lower troposphere was close to 2km/day. (See also W75-04054) (Houser-ORNL)
W75-04070

STATE OF STRONTIUM-90, CESIUM-137, AND CERIUM-144 IN RADIOACTIVE FALLOUT,
F. I. Pavlotskaya, R. Surotkevichiene, and G. P. Levina.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 111-117, 1 fig, 3 tab, 14 ref.

Descriptors: Meteorology, Nuclear energy, *Radioactivity, *Radioisotopes, *Fallout, Chemical properties, Chemical reactions, Solvents, *Strontium, *Cesium, *Cerium, Cation absorption, Anion adsorption, Ion exchange.

Investigations into the state and chemical form of existence of Sr90, Cs137, and Ce144 in global fallout during 1958-1968 are described. Substantial differences are shown between the soluble and insoluble fractions in the distributions of the different radionuclides. Independently of the geographical location of the observation stations, the decreasing soluble fraction in the indicated period is preserved in the sequence Sr90 > Cs137 > Ce144, the values being on the average 78, 62, and 16%, respectively. The radionuclides in the insoluble fraction possess different mobilities. When treating the insoluble remainder by 1 N CH3COONH4 and 1N HC1, more than 90% of the Sr90 and up to 65-70% of the Cs137 and Ce144 pass into the solution. The latter indicates that most of the radionuclides in the insoluble fraction are in exchange and mobile states, and not in the form of slightly soluble compounds (such as Ce02). In a soluble state, the radionuclides are present in cationic, anionic, and neutral forms. The ratios between the latter are different in the various radionuclides. The distribution between these three forms is 90, 6, and 4% for Sr90, 72, 16, and 12% for Cs137, 55, 18, and 27% for Ce144. Acertain trend is observed toward an increase in the relative fraction of Sr90 and Cs137 in anionic form and a decrease in the fraction in neutral form during the winter compared with the summer period. (See also W75-04054) (Houser-ORNL)
W75-04071

SOME THEORETICAL NOTIONS OF RADIOACTIVITY ACQUISITION BY RAINDROPS,
A. S. Avramenko, and K. P. Makhon'ko.
In: Nuclear Meteorology, Preceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 118-132, 8 fig, 21 ref.

Descriptors: *Meteorology, *Nuclear energy, *Absorption, *Raindrops, *Radioactivity, Precipitation(Atmospheric), Clouds, Air circulation, Size, Distribution, Nuclear explosions, Aerosols, Transmissivity, Fallout, Dusts, Scavengers.

An approximate model is given of the acquisition of radioactivity by raindrops during their formation and precipitation from a cloud. The process taking place in a cloud with ordered ascending currents, leading to the size distribution of the specific radioactivity of raindrops observed on the earth, is examined. Comparison of theoretical calculations of the concentrations of the products of nuclear bursts in raindrops of different sizes with experimental data enabled us to determine the value of the coefficient of radioactive aerosol-particle washout by cloud-borne droplets and to establish the existence of an inverse relationship between the concentration of nuclear burst products in cloud-borne droplets and their radius. This relationship is near-inverse for raindrops. The obtained size distribution of the specific radioactivity of raindrops can lead to an increase in the specific radioactivity of rainwater at the end of brief showers due to the decrease in raindrop size. (See also W75-04054) (Houser-ORNL)
W75-04072

DISTRIBUTION OF RAINDROPS WITH RESPECT TO SPECIFIC RADIOACTIVITY,
For primary bibliographic entry see Field 2B.
W75-04073

APPLICATION OF THE STOCHASTIC APPROACH TO THE PROBLEM OF THE RADIOACTIVITY OF RAINDROPS AND CLOUD-BORNE DROPS,
A. S. Avramenko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 137-145, 1 fig, 13 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioactivity, *Raindrops, *Statistical models, *Stochastic processes, Mathematics, Distribution, Clouds, Rain, Size.

An attempt is made to apply the stochastic approach to the problem of the radioactivity of raindrops and cloud-borne drops. A general system of equations is written with which to calculate the distribution function of the cloud-borne drops with respect to activity for the radioactive series of natural decay products in elemental state. A steady solution is given for the case when the concentrations of the preceding elements of the radioactive series can be neglected. The obtained distribution is used to derive a relationship between the number of nonradioactive raindrops and their size. The theoretical relationships and published experimental data are in satisfactory agreement. (See also W75-04054) (Houser-ORNL)
W75-04074

COMPARISON OF THE CHARACTERISTICS OF HYGROSCOPIC AND NON-HYGROSCOPIC AERSOL WASHOUT BY CLOUD-BORNE DROPS,
I. I. Burtsev, and L. V. Burtseva.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 146-153, 4 fig, 2 tab, 11 ref.

Descriptors: *Meteorology, Nuclear energy, *Radioactivity, *Fallout, *Raindrops, *Aersols, *Hygroscopic water, Moisture, Adsorption, Distribution, Particle size, Raindrops, Physical properties, Comparative productivity, Radioisotopes.

Washout by cloud-borne drops of aerosol of size 0.1-0.5 microns is examined as a function of its hygroscopicity. Radioactive hygroscopic P2(to the 32nd power)05 and non-hygroscopic Sr89CO3 aerosols were investigated and their washout characteristics compared. On the basis of an experimental comparison of the characteristics of the capture of aerosol of the same disperse group, but with different physical properties, that the hygroscopicity of the aerosol substantially affects its behavior in a cloud medium. The capture efficiency of hygroscopic aerosol is twice that of nonhygroscopic aerosol. (See also W75-04054) (Houser-ORNL)
W75-04075

ATMOSPHERIC WASHOUT OF RADIOACTIVE CONTAMINANT IN THE MOUNTAINS OF CENTRAL CAUCASUS,
A. S. Avramenko, and K. P. Makhon'ko.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 154-165, 4 fig, 3 tab, 22 ref.

Descriptors: *Meteorology, *Nuclear energy, *Radioactivity, *Fallout, *Rain, Measurement, Altitude, Clouds, Atmosphere, Dusts, Assay, Precipitation(Atmospheric), Snow, Air circulation, Velocity, Sampling, Radon.
Identifiers: Specific radioactivity.

The coefficient Sigma of radioactive dust washout from the subcloud layer of the atmosphere was determined by measuring the contaminant concentration in precipitation at two different altitudes in 1968-1969 in mountains. The mean value of Sigma for the products of nuclear bursts in steady rain was 3 times 10(-5) sec(-1); for showers Sigma is roughly twice as large, and for snows five times as large. Measurements during steady rain for upslope and downslope winds enabled us to estimate the mean speed of the ascending air currents, found to be approx 0.6 m/sec. With increase in precipitation intensity I the value of Sigma decreases rapidly at first, passes through a

minimum when I approx. 1 mm/hr, and then increases. Vertical air currents affect the obtained relationship. When measuring Sigma for short-lived decay products of radon, samples were taken simultaneously at two altitudes, a radiotelephone being used to ensure simultaneity. Due to the brief sampling time of rapidly decaying samples, the influence of fluctuations in the concentration of natural radioactivity in precipitation (C) and in air (q) and fluctuations in precipitation intensity was so large that it was not possible to determine Sigma for rains; for snow Sigma approx 9 times 10(-5) sec (-1) with a 95% error. Similarly, from the results of 313 observations no time-dependence was detected of the specific radioactivity of precipitation (C) against the background of the large fluctuations in the measured quantity. (See also W75-04054) (Houser-ORNL)
W75-04076

UTILIZATION OF NATURAL RADIOACTIVE SUBSTANCES IN THE STUDY OF TURBULENT EXCHANGE AND ATMOSPHERIC SCAVENGING BY MEANS OF GROUND MEASUREMENT,
V. N. Bakulin, E. E. Sen'ko, B. G. Starikov, and V. A. Trufakin.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 166-172, 2 fig, 14 ref.

Descriptors: *Meteorology, *Radioactivity, Winds, *Thoron, *Lead, Measurement, Atmosphere, Fallout, Anticyclones, Precipitation(Atmospheric), Rain, Aerosols, Transmissivity, Uniformity coefficient, Research and development, *Turbulence.
Identifiers: *Troposphere, *Stratosphere, *Inversion.

On the basis of round-the-clock measurements of the exhalation of thoron and the concentrations of thoron and Pb212 (ThB) at heights of 1 and 5 m, mean values were obtained of the growth rate of the turbulence coefficient with height in a summer anticyclone, equal to 5-10 cm/sec by day and about 3 cm/sec at night. These data enable one to evaluate the mean value of the turbulence coefficient in the lower km layer of the troposphere with the aid of ground measurements. Unlike thoron and Pb212(ThB), radon cannot be considered as existing in quasi-steady conditions, and nonsteady models of its behavior in the atmosphere must be used . Near the earth, the ratio between the decay products of radon is a good indicator of the time variation in the turbulent exchange . Maximum perturbations of equilibrium in the radon series are observed in the morning and evening, during the establishment and destruction of the night inversions. It is noteworthy that in the morning hours one can observe many specific features in the height distribution of radioactive substances, explained by the mechanisms of the inversion destruction process. Data are given about the washout coefficients of radioactive aerosols by precipitation on the basis of Pb212(ThB), radon and Pb210(RaD) concentration measurements. (See also W75-04054) (Houser-ORNL)
W75-04077

SOME FEATURES OF ATMOSPHERE CLEANSING BY GROUND CONDENSATION,
For primary bibliographic entry see Field 5A.
W75-04078

RELATION BETWEEN ATMOSPHERIC PRECIPITATION WASHOUT OF RADIO-ACTIVITY AND NONACTIVE IONS,
L. I. Piskunov, and S. I. Tarasov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 182-186, 32 ref.

Descriptors: *Meteorology, *Radioactivity, *Radioisotopes, *Stable isotopes, *Air pollution, *Correlation analysis, Equations, *Fallout, Rain, Evaluation, Radiation, Assessment, Research and development, Background radiation, Chlorides, Sulfates, Troposphere, Mathematics.

A correlation in the form of a power relationship is assumed between the atmospheric washout of radioactive and nonactive contaminants. The latter chlorides and sulfates were selected, they differ from the others in that their background ratio in atmospheric precipitation for the continental part of European USSR is stable. For a tropospheric background radioactivity, the constancy of the relation in atmospheric precipitation of the radioactivity q withrespect to the chlorides m and the sulfates n follows from their identical washout laws. On the basis of logarithmic equilibrium constants P1 and P2, it is possible to derive an approximate evaluation of the radioactive state of the atmosphere. To determine constants P1 and P2 one requires observations with sufficient statistics subject to the conditions of the background concentration of the contaminants. It is assumed that the absence of a correlation between dust washed out from the atmosphere, radioactive components, and the background concentration of nonactive ions can serve as an indicator of anomalous phenomena. (See also W75-04054) (Houser-ORNL)
W75-04079

ACCOUNTING FOR SOME NONSTEADY PROCESSES IN RECORDING NATURAL AIR RADIOACTIVITY,
For primary bibliographic entry see Field 5A.
W75-04080

COSMOGONIC SODIUM-22 AND BERYLLIUM-7 ISOTOPES IN INVESTIGATIONS OF ATMOSPHERIC DYNAMICS,
V. Y. Luyanas, R. Y. Yasyulenis, and B. I. Styro.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 194-196, 1 tab, 2 ref.

Descriptors: *Meteorology, Atmosphere, *Air pollution, Radioactivity, *Radioisotopes, *Sodium, *Beryllium, Evaluation, Ratios, Mathematics, Measurement, Aircraft, Sampling, Research and development, Background radiation.
Identifiers: Troposphere, Stratosphere, *Cosmogonic radioisotopes, Cosmic rays.

The possibility of using the ratio of concentrations of the cosmogonic radioisotopes Na22 and Be7 for dnetermining the penetration of stratospheric air to the earth's surface is examined. The measurements were carried out at Elektrenai and Vilnius between 1965 and 1969. In some cases, the Na22/Be7 ratio reached values that were typical of stratospheric air. It is preferable to use a pair of isotopes of which one has a lifetime of several years, to study the air exchange between the stratosphere and troposphere. (See also W75-04054) (Houser-ORNL)
W75-04081

ARGON SPALLATION YIELDS OF COSMOGONIC RADIOISOTOPES,
R. Y. Yasyulenis, V. Y. Luyanas, and B. I. Styro.
In: Nuclear Meteorology, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 197-200, 2 tab, 8 ref.

Descriptors: Meteorology, *Argon, *Radiation, *Nuclear physics, *Radioisotopes, Rates, Frequency, Mathematics, Equations, Yield equations, Elements(Chemical).
Identifiers: *Cosmic rays, *Cosmogonic radioisotopes, *Spallation.

The evaluation of the rates at which cosmogonic isotopes are formed by argon spallation is described. The cross sections of isotope formation are calculated from a refined Rudstam formula. The yields are given for one star of F18, Ne24, Na22, Na24, Mg28, Al28, Al29, Si31, Si32, P30, P32, P33, S37, C134, C136, and C138 isotopes. The yield dependence on one star from the depth of the atmosphere is also given. (See also W75-04054) (Houser-ORNL)
W75-04082

LONG-LIVED ALPHA-RADIOACTIVITY IN FALLOUT AT VILNIUS AND AT VARIOUS ATLANTIC LATITUDES,
For primary bibliographic entry see Field 5A.
W75-04083

SEASONAL BERYLLIUM-7 VARIATIONS IN GROUND LEVEL AIR,
For primary bibliographic entry see Field 5A.
W75-04084

CONCENTRATION OF SODIUM RADIOISOTOPES IN THE GROUND LAYER OF THE ATMOSPHERE AND IN PRECIPITATION,
For primary bibliographic entry see Field 5A.
W75-04085

CONCENTRATION OF PHOSPHORUS RADIOISOTOPES IN THE GROUND LAYERS OF THE ATMOSPHERE AND IN PRECIPITATION,
For primary bibliographic entry see Field 5A.
W75-04086

RADIUM-226 IN ATMOSPHERIC PRECIPITATION, AND THE POSSIBILITIES FOR LEAD-210, BISMUTH-210 AND POLONIUM-210 TO PENETRATE THE ATMOSPHERE FROM THE EARTH'S SURFACE,
For primary bibliographic entry see Field 5A.
W75-04087

POLONIUM-210 IN THE ATMOSPHERE AND ITS RATIO TO LEAD-210,
For primary bibliographic entry see Field 5A.
W75-04088

TIME FLUCTUATIONS OF LEAD-210 CONCENTRATION IN THE GROUND LAYER OF THE ATMOSPHERE,
For primary bibliographic entry see Field 5A.
W75-04089

ASSESSMENT OF RADON EMANATION FROM THE SURFACE OF EXTENSIVE TERRITORIES,
T. I. Sisigini.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 239-244, 2 fig, 3 tab, 10 ref.

Descriptors: *Meteorology, *Radium, *Radon, Movement, *Soils, *Measurement, Assay, Density.
Identifiers: *Emanation, Flux, USSR.

A method is discussed of assessing radon emanation from a surface covered by one type of soil, under uniform and stable conditions. The results of comprehensive observations are examined, including measurements of the flux density of radon from the soil surface into the atmosphere, of radon concentration in the soil profile to a depth of 2 m, emanation factors and radium content in the soil, and the determination of soil porosity and water content. Based on experimental data obtained at about 40 different locations in European USSR, a correlation is established between radium content in the surface soil layer and radon emanation into the ground layer of the atmosphere. (See also W75-04054) (Houser-ORNL)
W75-04090

FILTERING AEROSOLS WITH NATURAL ATMOSPHERIC RADIOACTIVITY THROUGH FIBROUS MATERIALS,
For primary bibliographic entry see Field 5A.
W75-04091

DEVELOPMENT OF A METHOD FOR DETERMINING THE SIZE DISTRIBUTION OF RADIOACTIVE AEROSOLS WITH THE AID OF FILTERING MATERIALS,
For primary bibliographic entry see Field 5A.
W75-04092

PRELIMINARY DATA ON THE MEASUREMENT OF THE ATMOSPHERIC AEROSOL CHARACTERISTICS WITH A CENTRIFUGAL SPECTROMETER,
For primary bibliographic entry see Field 5A.
W75-04093

MEASURING THE CONCENTRATION OF HIGHLY-DISPERSE RADIOACTIVE AEROSOLS BY THE DIFFUSION METHOD,
For primary bibliographic entry see Field 5A.
W75-04094

SEPARATE DETERMINATION OF RN, RAA, RAB, AND RAC CONCENTRATIONS IN AIR FROM THE ALPHA-ACTIVITY DECAY CURVE OF A FILTER,
For primary bibliographic entry see Field 5A.
W75-04095

NEW METHODS OF MEASURING RN220 (THORON) EXHALATION AND SOME RESULTS,
For primary bibliographic entry see Field 5A.
W75-04096

A SIMPLE TWO-DIMENSIONAL ANALYZER OF BETA-GAMMA COINCIDENCES IN THE STUDY OF RADIOACTIVE FALLOUT SAMPLES,
For primary bibliographic entry see Field 5A.
W75-04097

SPECTROMETRIC METHOD OF MEASURING THE CONCENTRATION OF NATURAL RADIOACTIVE AEROSOLS,
For primary bibliographic entry see Field 5A.
W75-04098

ISOTOPE ANALYSIS OF RADIOACTIVE FALLOUT AND AEROSOL SAMPLES BY BETA-SPECTROMETRY,
For primary bibliographic entry see Field 5A.
W75-04099

RAPID SYSTEM OF AUTOMATIC PUNCH-TAPE OUTPUT OF INFORMATION FROM THE AI-100-1 ANALYZER,
For primary bibliographic entry see Field 5A.
W75-04100

GRAPHOANALYTICAL METHOD FOR DETERMINING CESIUM-137 CONCENTRATION IN SOIL SAMPLES FROM THE GAMMA SPECTRUM,
For primary bibliographic entry see Field 5A.
W75-04101

RADIOCHEMICAL METHOD OF DETERMINING LOW STRONTIUM-90 CONCENTRATION LEVELS IN ENVIRONMENTAL SAMPLES,
For primary bibliographic entry see Field 5A.
W75-04102

FALLOUT AND ACCUMULATION OF RADIOACTIVE DECAY PRODUCTS IN 1966-1968 IN THE VICINITY OF LENINGRAD,
N. V. Vasil'eva, L. I. Gedeonov, Z. G. Gritchenko, M. I. Zhilkina, and V. M. Flegontov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 340-346, 3 fig, 2 tab, 8 ref.

Descriptors: Meteorology, Nuclear energy, *Fallout, *Nuclear explosions, *Measurement, *Radioisotopes, Cerium, Ruthenium, Zirconium, Cesium, Strontium, Density, Atmosphere, Air circulation, Movement.
Identifiers: *USSR(Leningrad).

Results are presented of observations of the isotope composition of global radioactive fallout in 1966-1968 in the Leningrad region, the fallout density of radioactive fission products, and the amount of radioactive products deposited on the ground surface at the observation point. Ce141, Ru103, and Zr95 were recorded in 1966-1968 in the ground layer of the atmosphere and in atmospheric precipitation. Longer-lived radionuclides such as Ce144 and Ru106, mostly penetrating from the stratospheric source of radioactive contamination, in 1968 contributed much to the overall proportion of total beta activity. The recording of these radionuclides in radioactive fallout samples in 1967 was at the sensitivity limit of the measuring instruments. The fallout density of Sr90 was 1.6 mcurie/km sq in 1966, 0.8 mcurie/km sq in 1967, and 1.0 mcurie/km sq in 1968; that of Cs137 was 1.3, 1.7, and 1.9 mcurie/km sq, respectively. Altogether 50.3 mcurie/km sq Sr90 and 96.9 mcurie/km sq Cs137 fell to the ground in 1954-1968 in the vicinity of Leningrad (the figures refer to the moment of fallout). Based on an analysis of the activity ratio of short-lived radionuclides (Ce141, Zr95) to long-lived ones (Sr90, Ru106, Ce137, Ce144), the global radioactive fallout in the Leningrad district in 1966-1968 is due almost entirely to 1966-1967 nuclear explosions, while Sr90 and Cs137 from earlier nuclear tests were present in insignificant amounts only. At the end of 1968, the accumulated activity of the total beta-radioactive fission products is given for major radioisotopes. Owing to the low rate of Sr90 and Cs137 fallout, the accumulated activity of these radionuclides remained at the 1965 level of 42.3 and 82 mcurie/km sq, respectively. (See also W75-04054) (Houser-ORNL)
W75-04103

PENETRATION OF RADIOACTIVE FISSION PRODUCTS FROM 1964-1967 NUCLEAR TESTS INTO THE GROUND LAYER OF THE ATMOSPHERE IN THE LENINGRAD AREA,
L. I. Gedeonov, Z. G. Gritchenko, and V. M. Flegontov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 347-352, 6 fig, 7 ref.

Descriptors: *Meteorology, *Nuclear energy, *Nuclear explosions, Testing, *Fallout, Density, Measurement, *Radioisotopes, Atmosphere, Barium, Lanthanum, Cerium, Ruthenium, Zirconium, Niobium, Cesium, Aerosols, Sampling, Stratosphere, Withdrawal.
Identifiers: Gamma spectrometers, *USSR(Leningrad), Troposphere.

Radioactive fission products formed during tests of nuclear weapons in countries that did not adhere to the Moscow agreement on the prohibition of nuclear tests in the three media were recorded in 1964-1968 in the ground layer of the atmosphere in the Leningrad area. The following radioactive isotopes were determined with the aid of a scintillation and a Ge(Li) drift gamma spectrometer in radioactive aerosols filtered out of the ground layer of atmospheric air: Ba140, La140, Ce141, Ru103, Zr95, Nb95, Ce144, Ru106, and Cs137. The forming of these radioactive fission products was dated from the activity ratios of the following pairs of radionuclides: Ba140/Ce141, Ce141/Zr95, Ce141/Ce144, Zr95/Ce144, and Ce144/Cs137. These radionuclides turned out to have been released into the atmosphere during the explosions of 14 October 1964, 14 May 1965, 9 May, 27 October and 28 December 1966, 17 June and 24 December 1967. Atmospheric nuclear tests of increasing power and the depletion of the stratospheric reserve of radioactive fission products from the 1961-1962 test series produced a stable balance in the stratosphere between the long-lived radionuclides from nuclear tests conducted in 1964-1967. The proportion of long-lived fission products from these nuclear explosions therefore began to predominate in 1966 in global radioactive fallout. (See also W75-04054) (Houser-ORNL)
W75-04104

STUDY OF THE RESISTANCE OF FIBROUS FILTERING MATERIALS IN RAREFIED AIR,
For primary bibliographic entry see Field 5A.
W75-04105

VERTICAL DISTRIBUTION OF THE CONCENTRATION OF RADON DECAY PRODUCTS IN THE 0-300-M LAYER,
L. V. Kirichenko, and S. G. Malakhov.
In: Nuclear Meteorology, Proceedings, All-Union Conference on Nuclear Meteorology, June 23-28, 1969, Obninsk. p 358-360, 2 tab, 1 ref.

Descriptors: *Meteorology, *Vertical migration, *Distribution, Height, *Measurement, *Radon, Data collections, Data transmission, Sites, Density, Analytical techniques, Filters, Air, Time, Temperature.
Identifiers: Temperature inversions, Troposphere.

Data on the vertical distribution of the concentration of radon decay products in the 0-300-m layer of the atmosphere are provided. The measurements were carried out in August 1961 on the Obninsk altitude tower of the Institute of Experimental Meteorology. During daytime, the concentration of radon decay products remains practically constant throughout the layer. In the evening and at night it drops rapidly with increasing altitude from the ground surface up to a height of 50-75m. (See also W75-04054) (Houser-ORNL)
W75-04106

NATURAL SNOWFLAKE RADIOACTIVITY DUE TO SHORT-LIVED RADON DECAY PRODUCTS,
For primary bibliographic entry see Field 5A.
W75-04107

TRACE ELEMENTS AND NATUR RADIOACTIVITY IN CLOUD WATER AND ATMOSPHERIC PRECIPITATION IN THE CENTRAL CAUCASUS MOUNTAINS,
For primary bibliographic entry see Field 5A.
W75-04108

BENTHOS AND ALLOCHTHONOUS ORGANIC MATTER IN STREAMS,
Waterloo Univ. (Ontario). Dept. of Biology.
H. B. Hynes, N. K. Kaushik, M. A. Lock, D. L. Lush, and Z. S. J. Stocker.
Journal of the Fisheries Research Board of Canada, Vol 31, No 5, p 545-553, May, 1974. 10 fig, 13 ref.

Descriptors: *Benthos, *Animal groupings, Autumn, Leaves, Streams, *Nutrients, *Organic matter, Ecology, *Decomposing organic matter, *Biodegration, Bacteria, Fungi, Food habits, Seasonal.
Identifiers: Gammarus, Chironomidae, Blackfly larvicide.

A coring technique showed that stream animals are vertically distributed many centimeters down

into the gravel, with 17 percent in the top 5 cm. Arctic stream sampling chironomid larvae comprised 70-80 percent of numbers in the benthos; their rate of drift did not vary with the time of day. The effect of nutrients and temperature on the decomposition of autumn leaves shed in water was studied. The addition of nutrients N and P increased the amount of nitrogen after incubation, but temperature affected only the decomposition rate. The importance of bacteria and fungi in decomposition were noted. Food preference for several leaf species were shown by Gammarus. Up to 40 percent of autumn-shed leaf is water-soluble. One process by which it is made available to stream animals is conversion to particles and involves mechanisms similar to those found in soils. Field investigations showed large-scale fluctuations, in a short time period, of dissolved and particulate matter in the water. (Carpenter-FIRL)
W75-04119

MIXING IN ANAEROBIC DIGESTION,
Notre Dame Univ., Ind. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 5D.
W75-04120

DICHROMATE RELUX CHEMICAL OXYGEN DEMAND: A PROPOSED METHOD FOR CHLORIDE CORRECTION IN HIGHLY SALINE WASTES,
Jacobs Engineering Co., Pasadena, Calif.
For primary bibliographic entry see Field 5A.
W75-04124

HYDRAULIC AND FLOW STUDIES RELATED TO SEDIMENT TRANSPORT, KENTUCKY RIVER, KENTUCKY,
Kentucky Water Resources Inst., Lexington.
For primary bibliographic entry see Field 2J.
W75-04147

INTERACTIONS BETWEEN LIGHT AND CARBON DIOXIDE AVAILABILITIES AS A CONTROL OF ALGAL SPECIES SUCCESSION,
Missouri Univ., Columbia. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5C.
W75-04148

POLLUTION POTENTIAL OF AQUATIC SEDIMENTS,
Missouri Univ., Rolla. Dept. of Civil Engineering.
J. C. Huang, L. A. Hinkle, K. C. Tsai, and M. Mariappan.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 258, $4.75 in paper copy, $2.25 in microfiche. Missouri Water Resources Research Center, Columbia, Completion Report, August 1974. 87 p, 24 fig, 14 tab, 26 ref. OWRT A-069-MO(1). 14-31-0001-4025.

Descriptors: *Pollutants, *Sediments, *Environmental effects, Water quality, *Water pollution sources, Humic acids, Hydrogen ion concentration, Water pollution effects.
Identifiers: Microbial activity.

Significant fractions of past incoming pollutants have accumulated in the sediment phase, which can gradually and continuously release the pollutants into the overlying water, thereby degrading the water quality. This study was undertaken to investigate important factors governing the release of pollutants from selected sediments and subsequent effects on water quality. Research data obtained have indicated that the mechanisms of pollutant release are mostly physical-chemical in nature. Biological action plays only a minor role. Magnitudes of pollutant release have been found to be more pH dependent than temperature dependent. An increase in pH will result in a corresponding increase in organic release which may be explained in part by the increased dissociation of humic acids at a higher pH. Under a closed system used in this study, the pollutant release can reach an equilibrium state in a matter of two to three days.
W75-04150

THE USE AND MISUSE OF POPULATION EXPOSURES IN RADIATION PROTECTION,
Environmental Protection Agency, Research Triangle Park, N.C.
For primary bibliographic entry see Field 5C.
W75-04154

POPULATION EXPOSURE TO NATURAL RADIATION BACKGROUND IN PUERTO RICO,
Puerto Rico Nuclear Center, Rio Piedras.
A. E. Gileadi, and D. L. Pitre.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 53-60, 5 fig, 1 tab, 9 ref.

Descriptors: *Monitoring, *Geographical regions, *Puerto Rico, *Background radiation, *Human population, *Distribution, Geography, Radioactivity, Fallout, Computer programs.
Identifiers: Natural radiation, Cosmic radiation, Demography, Terrestrial radiation.

External exposure to natural radiation background of the population in Puerto Rico has been estimated using published data concerning terrestrial and cosmic radiation, and demographic data on population distribution with respect to elevation and geographic location. Cosmic radiation data published by a number of investigators, along with methods to account for the variation of cosmic radiation intensity as a function of geomagnetic latitude and elevation, were used to determine the cosmic radiation dose equivalent as a function of geographic location in Puerto Rico. Data measured in the framework of the ARMS-Aerial Radiation Measurement Survey program at an elevation of 500 feet above ground level, along with an appropriate conversion factor, were used to evaluate the terrestrial component as a function of geographic location. Estimates of the annual dose equivalent rate due to exposure to external natural radiation background for each municipality of Puerto Rico and the insular average value were derived by means of a computer program written for that purpose. Inputs for this program included measured and calculated values of terrestrial and cosmic ray components of the natural radiation background in Puerto Rice, fallout corrections and relevant demographic data. (See also W75-04125) (Houser-ORNL)
W75-04160

TEMPORARY BODY BURDENS IN DOSE-EFFECT STUDIES OF THE BRAZILIAN AREAS OF HIGH NATURAL RADIOACTIVITY,
Pontificia Universidade Catolica do Rio de Janeiro (Brazil); and Universidade Federal do Rio de Janeiro (Brazil).
For primary bibliographic entry see Field 5C.
W75-04161

A REVIEW OF EFFLUENTS, GENERAL POPULATION DOSES, AND OCCUPATIONAL DOSES RESULTING FROM COMMONWEALTH EDISON'S USE OF NUCLEAR POWER,
Commonwealth Edison Co., Chicago, Ill.
J. C. Golden, and R. A. Pavlic.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 173-180, 3 fig, 3 tab, 10 ref.

Descriptors: *Nuclear powerplants, *Effluents, *Measurement, *Monitoring, *Human population, *Distribution, *Public health, Operations, Power operation and maintenance, Iodine, Tritium, Liquid wastes.
Identifiers: Population exposure, Occupational exposure, Non-occupational exposure, Doses, Noble fission gases.

Commonwealth Edison has 5270 MWe (net) of nuclear power licensed today and an additional 9316 MWe (net) scheduled for operation by the end of 1983. Operation of these power reactors exposes people to low level environmental and occupationally incurred radiation. The integral dose 'man-rem' is a useful term for measuring the total radiation dose received by a group of people because the term reflects the dose and population distributions within or around a station. At Dresden with three operating boiling water nuclear power reactors (BWR) units, the first of which began operation in 1960, the 1973 non-occupation population dose (to 50 miles radius) was 275 man-rem (with a shielding and occupancy factor of two included). At Quad Cities with two two-year old BWR units, the dose was 30 man-rem, and at Zion, two pressurized water reactor (PWR) units in startup testing, the dose was essentially zero. The 1973 occupational doses were 908 man-rem at Dresden, 201 man-rem at Quad Cities, and 15.4 man-rem at Zion. The annual population doses from natural radiations are 610,000 man-rem at Dresden, 60,000 man-rem at Quad Cities, and 720,000 man-rem at Zion. Hence, the total contribution to the population dose from operation of Commonwealth Edison's nuclear facilities--the sum of the occupational plus nonoccupational doses--is much less than one percent of that received from natural sources. A review is presented of the effluents, and general population and occupational doses resulting from Commonwealth Edison's use of nuclear power from 1960 to mid-1974. (See also W75-04152) (Houser-ORNL)
W75-04164

TRENDS IN POPULATION RADIATION EXPOSURE FROM OPERATING BWR GASEOUS EFFLUENTS,
Office of Radiation Programs, Washington, D.C.
J. A. Martin, Jr., C. B. Nelson, and H. T. Peterson, Jr.
In: CONF. 741018, Preceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 181-190, 2 fig, 3 tab, 15 ref.

Descriptors: *Nuclear powerplants, Effluents, *Measurement, *Radioactivity, *Diffusion, *Standards, Public health, Assay, Assessment, Safety, Evaluation, Xenon, Absorption, Control, *Air pollution.
Identifiers: Dose, *Population exposure, Boiling water reactors, Noble gases, Charcoal beds.

External radiation exposures resulting from atmospheric emissions of radionuclides from operating boiling water nuclear power reactors (BWRs) were computed using the EPA AIREM diffusion-dose code. In 1971, 10 operating BWRs generated a total of 1850 megwatt-years of electrical energy. Three million curies of noble gases were discharged resulting in a population-integrated radiation dose of 900 person-rems delivered to 16 million people. In 1972 14 BWRs produced 3400 MW(e)-yrs and resulted in a total population dose of 1650 person-rem to the 22.4 million people residing within 80 km (50 miles) of these facilities. Projections for the 400 GW(e) installed BWR capacity forecast for the year 2000 indicate that over 450 potential health effects could be committed annually if only a 30-minute holdup were employed. Use of charcoal adsorption beds with a 10-day xenon holdup could reduce this annual impact to 14 potential health effects. (See also W75-04152) (Houser-ORNL)
W75-04165

POPULATION EXPOSURE ESTIMATES AS DERIVED FROM AN ENVIRONMENTAL ASSESSMENT OF LWR FUEL CYCLE FACILITIES. PART I: POPULATION DOSES FROM OPERATING FACILITIES,
Oak Ridge National Lab., Tenn.
J. P. Witherspoon.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 191-198, 4 tab, 13 ref.

Descriptors: *Nuclear powerplants, *Fuels, *Environment, *Radioactivity, *Assessment, *Public health, Effluents, Model studies, Population, Uranium, Plutonium, Path of pollutants, Food chains, Operations, Ecology, Ecosystems.
Identifiers: Fuel reprocessing plants, Fuel cycle, Source terms.

Model facilities which are typical in terms of current design, location, and surrounding populations were used as the basis for this study. The radiological impacts of a uranium mill (2000 tons of ore per day), fuel fabrication plants (5 tons of uranium dioxide fuel per day and 1 ton of uranium-plutonium oxide per day), and a fuel reprocessing plant (5 tons of fuel per day were determined. Estimates of radiation dose to total body and organs of populations out to a distance of 50 miles were made for each facility. Sources of radioactive effluents were process dusts and airborne-tailings (mills), vented particulates (fabrication plants), and stack releases of gases and particulates (reprocessing plant). Pathways for external exposure (immersion in air and contaminated ground surface) and internal exposure (inhalation and ingestion) were considered. Estimates of radiation dose to populations (man-rems) and identification of exposure pathways and major radionuclides are given for each facility. (See also W75-04152) (Houser-ORNL)
W75-04166

POPULATION EXPOSURE ESTIMATES AS DERIVED FROM AN ENVIRONMENTAL ASSESSMENT OF LWR FUEL CYCLE FACILITIES, PART II: LONG-TERM POPULATION DOSES FOLLOWING CESSATION OF PLANT OPERATIONS,
Oak Ridge National Lab., Tenn.
J. P. Witherspoon, and D. C. Parzyck.
In: CONF. 741018, Preceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 199-206, 4 tab, 7 ref.

Descriptors: *Nuclear powerplants, *Fuels, *Effluents, *Radioactivity, *Environment, *Assessment, Safety, Evaluation, Population, Public health, Model studies, Uranium, Plutonium, Path of pollutants.
Identifiers: *Population exposure, Fuel cycle, Source terms, Doses.

The increased use of nuclear power reactors for generation of electricity will require a growth in the number of nuclear fuel cycle facilities to support the power reactors. Facilities in the nuclear fuel cycle release radionuclides to the environment which may contribute to population radiation dose long after the nuclear facility has ceased operation. The long-term environmental impact of model support facilities was studied. The contribution of the long-lived radionuclides released by the nuclear fuel cycle plants to long-term population exposures was calculated from the time of cessation of plant operations until significant decay of the radionuclides. The model plants were typical of current design and location, and the surrounding populations were representative of present-day populations. The model facilities included a uranium mill (2000 metric tons of ore per day), fuel fabrication plants (5 metric tons of uranium dioxide fuel per day, 1 metric ton of uranium-plutonium oxide fuel per day), and fuel reprocessing plant (5 metric tons of fuel per day). The longest-lived radionuclides released by each type of plant were enumerated and the area of radionuclide deposition defined. The significant pathways of exposure were examined with an evaluation of the population exposure resultant from resuspension of deposited activity, ingestion of deposited radionuclides, and radiation from contaminated ground surface. Dose estimates were made for populations (man-rems) living in the vicinity of the nuclear plants, and the average dose was calculated for the critical organ for each long-lived radionuclide. (See also W75-04152) (Houser-ORNL)
W75-04167

PROJECTIONS OF RADIOACTIVE WASTES FROM THE NUCLEAR FUEL CYCLE,
Oak Ridge National Lab., Tenn.
J. O. Blomeke, and C. W. Kee.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 215-222, 10 tab, 5 ref.

Descriptors: *Nuclear energy, *Nuclear reactors, *Nuclear powerplants, *Radioactivity, *Effluents, Properties, Waste identification, Waste treatment, Waste storage, Waste disposal, Fuels, Transportation, Assay, Assessment, Toxicity, Public health, Air pollution, Water pollution, Forecasting, Projections.
Identifiers: *Waste management, Fuel cycle.

Estimates of the properties and quantities of radioactive waste materials that will be generated in commercial nuclear fuel cycle operations are useful in establishing a basis for planning and development of safe and environmentally acceptable methods of management of these wastes. A comprehensive set of projects of radioactive wastes to be generated is projected for the remainder of this century based on the most recent forecast of nuclear power growth in the United States. Ten types of radioactive wastes are identified on the basis of their packaging, shipping, and probable disposal requirements, and the annual rates of generation, annual numbers of shipments, and accumulations of each type of waste are estimated. In addition, a measure of the relative toxicity of each waste on an annual and accumulated basis is tabulated. The measure of toxicity is defined as the cubic meters of air or water that would be required to dilute all the radioactive constituents of the waste to the concentrations specified in the AEC's Radiation Concentration Guide as being the maximum allowable for unrestricted use. (See also W75-04152) (Houser-ORNL)
W75-04169

DOSIMETRY OF INTERNAL EMITTERS FOR POPULATION EXPOSURE,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5C.
W75-04172

CONDOS-A MODEL AND COMPUTER CODE TO ESTIMATE POPULATION AND INDIVIDUAL RADIATION DOSES TO MAN FROM THE DISTRIBUTION, USE AND DISPOSAL OF CONSUMER PRODUCTS THAT CONTAIN RADIOACTIVE MATERIALS,
Oak Ridge National Lab., Tenn.
F. R. O'Donnell, F. H. Clark, O. W. Burke, L. R. McKay, and A. N. Tse.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 327-332, 2 tab, 3 ref.

Descriptors: *Monitoring, *Model studies, *Computer programs, *Radioactivity, *Instrumentation, *Distribution patterns, *Ion transport, *Waste disposal, Human population, Public health, Estimation, Assessment, Measurement.
Identifiers: Doses, Computer codes.

A model and computer code (CONDOS) is being developed that estimates radiation doses to man from distribution, use, and disposal of a variety of consumer products that contain radioactive materials. CONDOS utilizes a generalized format in which the life span of a consumer product is divided into five main stages (distribution, transport, use, disposal, and emergencies) that require descriptions of the activities by which man will be exposed to the product (events) during each stage. These descriptions delineate homogeneous groups of exposed persons, and thus facilitate the selection of individuals who represent the exposed groups. The radiation doses associated with one year of product use to the total body and selected reference organs and tissues of representative individuals can be estimated for each mode of exposure that is applicable to each event. Summation of the doses to representative individuals yields group and total population doses. An example of the use of CONDOS is presented. (See also W75-04152) (Houser-ORNL)
W75-04182

WATER FOR THE HUMAN ENVIRONMENT, VOLUME IV, SPECIAL SESSIONS.
Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois. 557 p.

Descriptors: *Water resources, *Conferences, *Planning, *Environment, *Thermal pollution, *Systems analysis, *Water pollution, Hydraulics, Heated water, Water temperature, Water cooling, Water pollution sources, Lakes, Aquatic environment, Ecology, Agriculture, Water quality, Waste water treatment, Hydrographs, Unit hydrographs, Watersheds(Basins), Heating.
Identifiers: *Human environment.

Water for the human environment was discussed at a congress held at Chicago in 1973. The four broad topics discussed in Volume IV were: (1) thermal pollution, (2) systems analysis, (3) post-construction assessment, and (4) water pollution. Subjects discussed included identifying and assessing local thermal inputs on physical and biological environments, experimental and analytical characterization of thermal discharge, utilization of waste heat in agriculture, wastewater treatment, recreation, and a system concept incorporating power generation with other industrial process activities. (See W75-04214 thru W75-04258) (Humphreys-ISWS)
W75-04213

EVALUATION OF WATER TEMPERATURE FIELDS RESULTING FROM HEATED WATER DISCHARGES,
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
H. Stefan, and T. Skoglund.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 32-47. 12 fig, 1 tab, 11 ref, 1 append.

Descriptors: *Thermal pollution, *Cooling water, *Thermal stratification, *Thermal powerplants, Thermal properties, Heat transfer, Water cooling, *Minnesota, Heated water, *Discharge(Water), Water temperature, Heat budget.
Identifiers: Upper Mississippi River, Lake St. Croix, Minneapolis-St. Paul.

Both physical and biological facts are needed to prevent real thermal pollution damage from heated water discharges to lakes and streams. The problem of obtaining such facts is compounded by

regional climatological and hydrologic conditions, plant operational conditions, and the forms of life in receiving water bodies. Four different cooling water outfalls in the Upper Mississippi River basin were used to show steady-state temperature distributions downstream of the outfall for various seasonal conditions, frequency and amplitude of hourly and daily transitory temperature characteristics, temperature versus residence-time relationships for various flow paths, and modifications of overall temperature levels through the heat budget and stratification. These evaluations of physical effects in a temperature-area-time frame can be useful for further biological interpretation. (See also W75-04213) (Harmeson-ISWS)
W75-04215

SOME CHARACTERISTICS OF COUNTERJET FLOW,
Sir George Williams Univ., Montreal (Quebec).
A. S. Ramamurthy, and L. Robillard.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 62-69. 4 fig, 1 tab, 2 ref.

Descriptors: *Jets, *Mixing, *Waste dilution, Circulation, Turbulence, Nozzles, Orifices, Diffusion, Discharge(Water), Outlets, Flow, Path of pollutants, Waste water treatment.
Identifiers: Jet orientation.

One of the methods of effectively diluting the industrial effluent (pollutant) in a stream is to inject the former as a counter jet into the stream. The orientation of the jet is a pertinent variable that influences the characteristics of the jet's near wake region where mixing occurs. There can be two distinct modes of counter jet flow for any given jet orientation. In one of the modes, the jet oscillates about the plane of symmetry. In the other mode, the jet stays on one side of the plane of symmetry and the mixing process in the jet wake region is drastically reduced. The mode of flow is dependent on the ratio of the jet velocity to the main stream velocity for fixed jet orientations and geometry of the injecting device. (See also W75-04213) (Jess-ISWS)
W75-04217

SOME RESULTS FROM EXPERIMENTAL DATA ON SURFACE JET DISCHARGE OF HEATED WATER,
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
M. A. Shirazi.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 89-108. 4 fig, 2 tab, 12 ref.

Descriptors: *Thermal pollution, *Heated water, *Jets, *Surface waters, Thermal powerplants, Distribution patterns, Analytical techniques, Dimensional analysis, On-site data collections, Laboratory tests, Flow, Hydraulics, Currents(Water), Discharge(Water), Froude number, Water temperature.

Published laboratory and field data on heated surface jets were compiled from several sources and presented in a unified and easily usable format. Partial analysis of the data was presented to show the general influences of the (a) ambient current, (b) the initial discharge angle, (c) the jet densimetric Froude number and, (d) the jet aspect ratio on the plume trajectory, plume half-width, and centerline temperature. Due to a lack of comprehensive high quality data, it was not possible at this time to specify the precise effects of the ambient current, the jet densimetric Froude number, the aspect ratio, and the angle of discharge on the plume behavior. However, despite the scatter and the elementary nature of the data analysis, the qualitative results appeared to be physically reasonable. They presented a general picture of the plume and were believed to be of considerable utility in the development of mathematical models for surface jets. A complete tabulation of the data was conveniently grouped and identified. (See also W75-04213) (Humphreys-ISWS)
W75-04220

COOLING POND TEMPERATURE PREDICTION,
Towson State Coll., Baltimore, Md. Dept. of Computer Science.
W. L. Graves, Jr.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 120-132. 7 fig, 1 tab, 3 ref.

Descriptors: *Cooling water, *Powerplants, *Water temperature, Thermal power, Thermal powerplants, Simulation analysis, Computer models, Water cooling, Planning, Ponds, Model studies, *Forecasting, *Thermal pollution.
Identifiers: Thermoelectric power, Signal theory.

A model was described that predicts temperature responses in the environment that are associated with the operation of a natural gas fueled thermoelectric power generation station. The model is a piecewise computer simulation, limited to closed cooling water systems. The techniques developed may be applicable to larger-class cooling systems. Signal theory methods were used to simplify the digital computer analysis. An optimal data set, from the point of view of information per unit cost, was described for the model. (See also W75-04213) (Terstriep-ISWS)
W75-04222

SOME BIOLOGICAL ASPECTS OF AQUATIC THERMAL DISCHARGES,
Yale Univ., New Haven, Conn. Dept. of Biology.
For primary bibliographic entry see Field 5C.
W75-04225

THERMAL POLLUTION ASPECTS IN EUROPE,
Ente Nationale per l'Energia Elettrica, Florence (Italy). Compartimento di Firenze.
F. P. Guli.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 165-179. 6 fig, 35 ref.

Descriptors: *Thermal pollution, *Cooling water, *Thermal powerplants, *Nuclear powerplants, *Europe, Powerplants, Streamflow, Sea water, Energy budget, Water pollution sources, Water pollution effects.

Current energy consumption in Europe was assessed and recent forecasts of future total energy requirements were reported. The cooling potential for conventional steam electric and nuclear power production of European rivers, lakes, and ponds are being assessed on the basis of five indexes: (1) 'power density' which is the ratio of a country's installed thermal power capacity to its area; (2) 'sea coastal availability' which is a ratio of installed thermal power capacity to the country's sea coast length; (3) 'fresh water disposability(I)' which is the ratio between average yearly streamflow originating in a country and its average yearly once-through cooling water withdrawals; (4) 'freshwater disposability (II)' which is the ratio between a country's average yearly streamflow leaving its boundaries and its average yearly once-through cooling water, withdrawals; and (5) 'thermal discharge loading' which is the quotient of a country's yearly average thermal plant heat discharges and its yearly average solar radiation. Because of the steadily increasing demand for electrical energy in all of Europe, the adoption of uniform control regulations was urged and the free exchange of meteorological, hydrological, and ecological data was proposed. (See also W75-04213) (Harmeson-ISWS)
W75-04226

DESIGN OF THERMAL COOLING SYSTEMS USING THE CASCADE OF ENERGY CONCEPT,
Oklahoma Univ., Norman. Dept. of Aerospace, Mechanical and Nuclear Engineering.
For primary bibliographic entry see Field 5D.
W75-04228

REVIEW OF HEATED SURFACE DISCHARGE MODELS APPLICABLE TO RIVERS,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
B. A. Benedict, and L. T. Jones.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 194-203. 6 fig, 12 ref. EPA Grant Nos. 16130 FDQ and R-800613.

Descriptors: *Heated water, *River systems, *Mathematical models, Discharge(Water), Jets, Diffusion, *Thermal pollution, Ecology, Cooling water, Density, Froude number, Drag, Model studies, *Path of pollutants, *Reviews.
Identifiers: Waste heat, Crossflows.

Currently available mathematical models for heated water surface discharges were reviewed. This review showed that four models could be utilized for river systems. Models selected included one jet model by Motz and Benedict; three diffusion models; the Cornell version of the Brooks diffusion model; and the two-dimensional and three-dimensional models presented by Edinger and Polk. In addition, the data from Carter showed promise but had a very limited range of applicability. For each model generalized, nondimensional solutions were developed in graphical form with the quantities of surface area, longitudinal distance, and lateral distance shown plotted against temperature rise. Models were compared for a hypothetical case. Model comparisons generally showed no great difference between two-dimensional and three-dimensional models. The jet model gave results that were similar to those of the diffusion models. (See also W75-04213) (Bhowmik-ISWS)
W75-04229

MATHEMATICAL MODELLING AND IDENTIFICATION OF THERMAL POLLUTION IN STREAMS: A REVIEW PAPER,
Case Western Reserve Univ., Cleveland, Ohio. Systems Engineering Div.
J. W. Foley, M. A. Cardenas, and Y. Y. Haimes.
In: Water For The Human Environment, Vol IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 204-216. 1 fig, 1 tab, 12 ref.

Descriptors: *Heated water, *Dispersion, Analytical techniques, *Thermal pollution, Diffusion,

Degradation(Streams), Model studies, Computers, Environmental effects, Water temperature, Streams, Lakes, *Mathematical models, *Path of pollutants, *Reviews, *Pollutant identification.
Identifiers: *Model topology, Identification structures.

Dynamic mathematical models are required to represent the dynamic nature of the dissipation of thermal pollution in water bodies. The trade-off between sophistication in system modeling and the cost of the analysis is an important consideration in the selection of model topology. For dynamic systems, quasilinearization has proved to be an effective methodology for improving a model's topology. A basic exponential decay of the excess temperature with respect to a particular equilibrium temperature is usually postulated for tackling the temperature prediction problem in the case of streams with assumed one-dimensional, homogeneous flow characteristics. The model input includes mean velocity, exchange coefficient, equilibrium temperature, and boundary conditions. Using more flexible system techniques, the temperature prediction was shown to be very tractable for streams, lakes, impoundments, and other water bodies. Present day computers permit the structuring of data generation and identification-strategy ranking schemes which can complement more traditional model and parameter estimate procedures. (See also W75-04213) (Singh-ISWS)
W75-04230

THERMAL POLLUTION OF THE GREAT LAKES -- A NON-PROBLEM,
Argonne National Lab., Ill.
P. F. Gustafson.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 217-223. 1 ref.

Descriptors: *Thermal pollution, *Great Lakes, *Cost-benefit analysis, Lake Michigan, Powerplants, Cooling water, Heated water, Water temperature, Water quality, Biological communities, Ecology, Freshwater, Decision making.

The Great Lakes are a significant multipurpose freshwater resource for the United States and Canada. With the growing number of steam-generating plants for electric power being built on both sides of the border, it is not surprising that the Great Lakes are being looked at as a source of condenser cooling water. The Great Lakes have been, and continue to be, subjected in varying degrees to stresses due to human activity along their shores. In some cases there are demonstrable adverse changes in water quality, accompanied by undesirable changes in the biological communities within these waters. Man-made thermal discharges constitute an additional artificial input to the lake system, and have the potential for producing adverse effects. Considerable public concern has arisen in regard to the effects of this thermal pollution. In recent years considerable research has been done on Lake Michigan to determine natural and man-made thermal distributions and their effects upon the biota in the lake. The research underway on the Great Lakes is a necessary step in determining the capacity of the lakes to act as heat sinks without causing unacceptable ecological damage. Cost-benefit analyses are also underway to determine if shifting from once-through cooling to closed-cycle cooling systems would be a wise decision. (See also W75-04213) (Scott-ISWS)
W75-04231

NITRIFICATION IN SOIL-WATER SYSTEMS: A COMPUTERIZED ACTIVATED COMPLEX MODEL,
Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
M. J. Shaffer, and G. R. Dutt.
In: Water for the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 284-294. 4 fig, 3 tab, 11 ref.

Descriptors: *Nitrification, *Soils, Soil-water-plant relationships, *Soil water, Nitrites, Nitrates, Digital computers, Computer programs, Computer models, Nitrogen fixing bacteria, Fertility, Nitrogen compounds, Great plains, Nitrogen cycle, Incubation, California, Arizona, Soil contamination, Fertilization.
Identifiers: *Typic torriorthent soils, *Typic torrifluvent soils, Nitrifiers.

A computerized model was developed to predict nitrification rates in soil-water systems. Model construction involved the application of activated complex theory together with experimental nitrification rate data provided by an incubation study of two soils. These data indicated that the activated complex has a structure more like NH20H or NH4 (+) than like NO2 (-). The completed model was verified by application of published nitrification data for two soils from the northern great plains. Correlation coefficients of 0.944 and 0.940 were obtained for the individual soils. (See also W75-04213) (Sanderson-ISWS)
W75-04235

MECHANICS OF DISPERSION OF POLLUTANTS IN COASTAL ENVIRONMENT,
Department of Water Affairs, Orania (South Africa).
J. M. Jordaan, Jr.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 307-318. 5 fig, 4 ref.

Descriptors: *Pollutants, *Sea water, *Dispersion, *Mathematical studies, *Effluents, Diffusion, Turbulence, Seashores, Waves(Water), Waste dilution, Coasts, Environment, Surf, Model studies, On-site tests, *Path of pollutants, Water pollution sources.
Identifiers: Mill-pond conditions.

The diffusion process is governed by boundary and initial conditions. In the case of effluent discharging into the marine environment its controls at the release point are known as a slug flow or a continuous discharge. To assess the process governing the diffusion and to predict its further progress mathematically, it is necessary to determine the state of the receiving medium or its capability to disperse the diffusant. Diffusion constants can be measured by slug dosing and by sampling the center of the patch at intervals. The natural processes that control the dispersion in the nearshore regions were studied in a wind-wave channel and in the field. Interpretative conclusions were drawn on the practice of nearshore disposal of effluents. Some of the significant conclusions were: turbulance levels are proportional to wave height squared and reciprocal of wave period; the mass transport of the diffused current increases with distance of travel indicating a regular entrainment over the width of the surf zone; in the mill-pond situation, the effluent remains in a well-defined patch with a clearly defined edge; a safe disposal distance offshore is not less than 2 kilometers for industrial effluents on typical open straight shorelines; and pre-dilution of effluents is advantageous before discharge to guard against the possibility of mill-pond conditions. (See also W75-04213) (Singh-ISWS)
W75-04237

DEVELOPMENT OF A COMPLETE MATHEMATICAL MODEL FOR DESCRIBING THE POINT BEACH NUCLEAR POWER PLANT THERMAL PLUME,
Limnetics, Inc., Milwaukee, Wis.
D. S. Wu, and B. J. Gallagher.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 319-336. 6 fig, 13 ref.

Descriptors: *Heated water, *Nuclear powerplants, *Condensers, *Cooling water, *Mathematical models, Water quality, Environmental effects, Analytical techniques, Channels, Flow characteristics, *Lake Michigan, Electric powerplants, Equations, Model studies.
Identifiers: *Point Beach Plant, Thermal Plume.

Approximately 20 large electric generating plants in Lake Michigan require more than 1000 cfs of cooling water each for their condenser units. Development of mathematical models for predicting temperature distributions underscores the efforts to help establish water quality guidelines and to design and locate discharge structures so as to minimize adverse impacts on the receiving environment. The Wisconsin Electric Power Company's Point Beach Plant on the west coast of Lake Michigan uses about 1500 cfs of water for condenser cooling and discharges it to the lake through two 35 ft wide and 13.5 ft deep channel flumes. The water temperature rises by about 10C under full load conditions. The governing equations of the four characteristics resulting from a heated discharge in a receiving water body are the equations of continuity, motion, diffusion, and state. The flow field was considered in two parts: the near field where the one-dimensional integral approach is valid, and the far field where the differential approach is applied. Complete mathematical models were developed to cover both the near and far fields. Existing near field models were integrated to the far field models by solving the diffusion equation. The two fields were connected through the consideration of the plume centerline velocity. (See also W75-04213) (Singh-ISWS)
W75-04238

REJUVENATION OF THE BUFFALO RIVER,
State Univ. Coll., Buffalo. Great Lakes Lab.
For primary bibliographic entry see Field 5C.
W75-04248

DISPOSAL OF POLLUTED DREDGINGS FROM THE GREAT LAKES AREA,
Northwestern Univ., Evanston, Ill. Technological Inst.
R. J. Krizek, and G. M. Karadi.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 482-491. 3 tab, 6 ref.

Descriptors: *Dredging, *Channel improvement, *Disposal, *Great Lakes, *Sediments, Lake sediments, Pollutants, Dikes, Settling basins, Water pollution, Sediment distribution, Sediment yield, Suspended solids, Deposition(Sediments), Water pollution treatment, Dams, Embankments, Levees, Harbors, Excavation, Navigation, Landfills, Bottom sediments.
Identifiers: *Spoil disposal.

Since much of the spoil dredged from the harbors and waterways around the Great Lakes is classified as polluted, open lake disposal is prohibited. Pursuant to a study of several alternative methods of disposal, technical and economic reasons indicate that the placement of these dredgings in

diked containment areas is the best currently available solution. When properly done, such a procedure can successfully remove pollutants from the lake environment and create new landfill for community or industrial development. However, in order to maximize the potential usefulness of such a landfill, the dredging operation should be properly designed and carried out according to a well planned schedule, but the technical feasibility of obtaining an effective distribution of the dredged materials and accelerating the drying process is governed to a large degree by the difficulties associated with the large scale of the operation. In addition to the pollution related aspects of the dredgings disposal problem, many other factors enter into a comprehensive evaluation of the alternatives, and economic considerations do not clearly justify the use of diked containment areas instead of open water disposal. (See also W75-04213) (Sanderson-ISWS)
W75-04251

A SURVEY OF ORGANIC CARBON CONSTITUENTS IN NATURAL FRESH WATERS,
Minnesota Univ., Minneapolis. Dept. of Civil Engineering and Hydraulics.
W. J. Maier, H. L. McConnell, and L. E. Conroy.
In: Water for the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 500-513. 8 fig, 4 tab, 15 ref, 1 append.

Descriptors: *Organic compounds, *Carbon, *Organic matter, *Testing procedures, Water properties, Inorganic compounds, Decomposing organic matter, Data collections, Measurement, Great Lakes region, *Minnesota, Organic acids, Organic wastes, Water quality, Oxygen sag, Photosynthesis, Seasonal, Flow, Analytical techniques, Anaerobic conditions.
Identifiers: St. Croix. Basin(Minn), St Louis River(Minn).

A one year test program to determine organic and inorganic carbon concentrations in Minnesota's major bodies of water was carried out. Carbon contents were measured with a modified Beckman Carbon Analyzer. The organic carbon concentrations in the major Minnesota river basins range from 7 to 45 mg/l with a mean of 22 mg/l; Lake Superior is the exception and has about 5 mg/l in the near shore area. Seasonal variations and the effects of flow were discussed. Information about sources and composition of naturally occurring organics was reviewed. The results provide some bench marks for assessing present water quality and for use as reference points in evaluating long term trends. (See also W75-04213) (Henley-ISWS)
W75-04252

INTERACTION OF BULK PRECIPITATION, STREAM WATER, AND SEWAGE IN A SMALL WATERSHED NEAR OXFORD, MISSISSIPPI,
Mississippi Univ., University. Dept. of Geology and Geological Engineering.
K. J. Banaszak.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 524-536. 2 fig, 4 tab, 29 ref. OWRR A-063-MISS(2).

Descriptors: *Rainfall-runoff relationships, *Water sources, *Watersheds(Basins), *Surface runoff, *Precipitation(Atmospheric), Rain, Rainfall, Runoff, Streamflow, Streams, Surface water, *Small watersheds, Analytical techniques, Surface drainage, Trace elements, Water analysis, Testing procedures, Sampling, Nutrients, Geologic formations, Heavy metals, Erosion rates, *Mississippi.
Identifiers: Oxford(Miss), Atomic absorption spectroscopy.

A 500 hectare (54% forest, 26% pasture and fallow field, and 20% rural urban) rainfed watershed near Oxford, Mississippi, was studied from July 1, 1972, to June 30, 1973. During this period, 200 centimeters (132 cm are 'normal') of precipitation with an average pH of 4.6 and an average composition in parts per million of 0.66 calcium, 0.04 magnesium, 0.54 sodium, and 0.23 potassium fell. The stream discharge of 80 centimeters had a neutral pH and an average composition in parts per million of 6.4 calcium, 1.5 magnesium, 6.4 sodium, 2.2 potassium, 13 bicarbonate, 12 sulfate, and 5.5 chloride. A sewage influx of 50 liters per second had little noticeable effect on the composition of storm runoff. The reasons for the change from bulk precipitation to stream water are not clear but must involve biologic, aerosol, and anthropogenic material. The change is compatible with a change from a water in equilibrium with gibbsite to a water in equilibrium with gibbsite and kaolinite. The net output for the study period from the watershed in kilograms per hectare-year was 43 for calcium, 12 for magnesium, 44 for sodium, 14 for potassium, and 36 for silica. These outputs are not compatible with earlier studies but are compatible with gross chemical erosion rates. Data for cadmium and zinc were inconclusive. A major study was suggested to determine the true input by aerosols, both natural and anthropogenic, to watersheds. (See also W75-04213) (Henley-ISWS)
W75-04254

WATER QUALITY ASPECTS OF THE 1973 OPENING OF THE MISSISSIPPI RIVER DIVERSION SPILLWAY AT BONNET CARRE, LOUISIANA, U.S.A.,
Army Engineer District, New Orleans, La.
P. G. Combs, and E. P. Russo.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 548-557. 4 fig, 1 tab, 3 ref.

Descriptors: *Diversion structures, *Flood control, *Flood protection, *Levees, *Flood routing, *Mississippi River, Diversion, Floodways, Watershed management, Mississippi River Basin, Drainage systems, Floods, Spillways, Water quality, Flood discharge, Salinity, Aquatic life, Flood data, Estuaries, Sampling, Louisiana.
Identifiers: Bonnet Carre Spillway(La), Nursery area, *Lake Pontchartrain(La).

The Bonnet Carre Spillway is located on the east bank of the Mississippi River approximately 40 km above New Orleans. The spillway consists of 9 km of leveed floodway conveying water from the Mississippi River to Lake Pontchartrain, then into Lake Borgne and into the Gulf of Mexico. In 1973 when it became evident that flood waters would have to be diverted through the Spillway, and since Lake Pontchartrain is considered a nursery area for many marine species, a water quality sampling program was established to document the effect that the diverted water would have on the Lake Pontchartrain estuary. One of the most extensive data gathering programs ever undertaken by the New Orleans District of the Corps of Engineers was initiated with the opening. Visual observations and remote sensing were made by NASA on a daily basis from an altitude of 2440 m, intermittently by NASA-STAR at 20,000 m, and also by means of the Earth Resources Technology Satellite which processed data in four different wavelengths. Results of these remote sensings and ground truth data were compared. Bottle samples were obtained at 70 locations daily and were analyzed for the presence of 28 parameters which included heavy metals, nutrients, bacteria, sediment, etc. In situ measurements of temperature, pH, salinity, and dissolved oxygen were also made at these 70 locations. The progression of the river water through the lake was also given, showing the retarding effects of the extremely high gulf tide that occurred during this period. (See also W75-04213) (Henley-ISWS)
W75-04256

AN ANALYSIS OF OIL OUTFLOWS DUE TO TANKER ACCIDENTS, 1971-1972.
Henry (J.J.) Co., Inc., Moorestown, N.J.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-780 315, $6.25 in paper copy, $2.25 in microfiche. Report No. CG-D-81-74, November 1973. 157 p, 15 fig, 29 tab, 6 ref, 3 append. DOT-CG-31,445-A.

Descriptors: *Oil spills, *Accidents, *Oceans, *Oil pollution, Ships, Damages, Oil, Disasters, Water pollution sources, Evaluation, Data collections, *Path of pollutants.
Identifiers: Ship collisions, Ship groundings, Ship casualty data, Tanker pollution.

An analysis was made of the reported and estimated oil outflow resulting from tanker casualties. The data consisted of 1587 world-wide tanker casualties occurring in 1971-1972, of which 376 incidents involved pollution. Only tanker vessels exceeding 100 GRT were considered. Trend comparisons were shown between this two year period and the 1969-1970 period. Data tabulations of the 376 tanker polluting incidents and the 1587 tanker casualties were presented in appendixes. (Humphreys-ISWS)
W75-04260

COMPUTATION OF TIDES, CURRENTS, AND DISPERSAL OF POLLUTANTS IN THE NEW YORK BIGHT FROM BLOCK ISLAND TO ATLANTIC CITY WITH LARGE GRID SIZE, SINGLE AND TWO-LAYER HYDRODYNAMICAL-NUMERICAL MODELS, PART 4,
Environmental Prediction Research Facility (Navy), Monterey, Calif.
T. Laevastu, R. Callaway, A. Stroud, and M. Clancy.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-778 617, $4.75 in paper copy, $2.25 in microfiche. Technical Note No. 4-74, January 1974. 84 p, 69 fig, 1 tab, 9 ref.

Descriptors: *Currents(Water), *Mathematical models, *Estuaries, *Computer models, Tides, Circulation, Dispersion, Pollutants, Analytical techniques, Hydrodynamics, Numerical analysis, Model studies, New York.
Identifiers: *New York Bight, Two-layer model, Flushing times.

One- and two-layer large grid hydrodynamical-numerical models were applied to the New York Bight. A few current measurements from lightships were used to verify the models. Tidal currents and wind currents were computed to determine overall circulation patterns. Definite differences in current velocity and direction between the upper and lower layers were demonstrated. Diffusion computations for short time periods were not fully satisfactory. The movement of the centers of release points and net transport through various sections were presented. Graphical results were presented to demonstrate the application of the computer models. To a large extent the problem depended on conditions along two long, open boundaries. The specified conditions on these open boundaries were used to tune the results inside the computational region. (Adams-ISWS)
W75-04262

INDUSTRIAL WASTEWATERS, RED RIVER ARMY DEPOT, TEXARKANA, TEXAS,
Army Construction Engineering Research Lab., Champaign, Ill.
For primary bibliographic entry see Field 5D.

W75-04263

METHODS FOR ESTIMATING TRANSPORT MODEL PARAMETERS FOR REGIONAL GROUNDWATER SYSTEMS,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
For primary bibliographic entry see Field 2F.
W75-04271

MARINE STUDIES OF SAN PEDRO BAY, CALIFORNIA, PART V; DATA REPORT, TEMPERATURE, SALINITY, OXYGEN AND HYDROGEN ION CONCENTRATION IN OUTER LOS ANGELES HARBOR, JUNE 1971 TO NOVEMBER 1973.
Southern California, University of Los Angeles. Sea Grant Program.
Available from the National Technical Information Service, Springfield, Va. 22161, as COM-74-11122, $4.75 paper copy, $2.25 microfiche. Report No. USC-SG-3-74, February 1974. 76 p, 1 fig, 5 ref. Edited by Soule, D.F., and Oguri, M. NOAA 04-3-158-45.

Descriptors: *Water properties, *Salinity, *Temperature, *Hydrogen ion concentration, *Dissolved oxygen, Sea water, Physical properties, Saline water, Chemical properties, Water quality, Water analysis, Testing, Sampling, Monitoring, Instrumentation, Conductivity, Data collections, Computers, Environment, Harbors, *California.
Identifiers: Marine studies, *Los Angeles Harbor(Calif), San Pedro Bay(Calif).

Data were presented showing the temperature, salinity, dissolved oxygen content, and the pH of the water in the outer Los Angeles Harbor from June 1971 to November 1973. Graphs indicating these water quality parameters were produced by computer plots. Single monthly readings were taken at each station at one meter increments to give profiles of parameters with depth. Each monthly segment showed readings at 0, 5, 10, 15, and 20 meters on the horizontal axis and the appropriate unit of temperature, salinity, dissolved oxygen, or pH on the vertical axis. Dotted lines connected the highs and lows to show seasonal trends, while solid lines between the dotted lines indicated changes in the profile with depth. Complete data, from which the graph points were taken, were presented in computer printout tables. (Henley-ISWS)
W75-04272

EXPERIMENTAL METHODS FOR OBTAINING PERCOL MODEL INPUT AND VERIFICATION DATA,
Battelle-Pacific Northwest Labs., Richland, Wash. Water and Land Resources Dept.
R. J. Serne, R. C. Routson, and D. A. Cochran.
Available from the National Technical Information Service, Springfield, Va. 22161, as BNWL 1721, $4.00 paper copy, $2.25 microfiche. Report No. BNWL-1721, 1973. 38 p, 9 fig, 5 tab, 24 ref. AEC Contract AT (45-1)-2130.

Descriptors: *Model studies, *Basic data collections, *Chemical reactions, *Numerical analysis, Computer programs, Chemical wastes, Cation exchange, Mathematical studies, Physical properties, Hydraulic models, Soil chemistry, Soil analysis, Percolation, Infiltration.
Identifiers: *Model verification data, Equilibrium model.

A soil-waste chemical equilibrium model, PERCOL, was developed to numerically simulate the complex chemical reactions that occur while a solution is percolating through porous media. Procedures for measuring the many parameters and necessary input data were described. To validate the PERCOL model, small experimental columns were packed with soil and simulated waste solutions were pumped through the columns to approximate percolation. The effluent solution was serially collected and its chemical composition determined and compared with PERCOL's predictions. The column verification methods were described. Parameters measured included soil cation-exchange capacity, soil cation selectivity constants, soil apparent porosity, soil moisture content, soil bulk density, trace constituent sorption constants, sparingly soluble salt content, soluble salt content, and influent and effluent solute chemical composition. (Prickett-ISWS)
W75-04276

BIOLOGICAL PROCESSES INVOLVED IN POLLUTION OF COASTAL AQUACULTURE WATERS,
Central Inland Fisheries Research Inst., Barrackpore (India).
For primary bibliographic entry see Field 5C.
W75-04281

INVESTIGATION FOR THE MARINE DISPOSAL OF EFFLUENTS,
Watson (J. D. and D. M.), London (England).
K. D. Staples.
Water Pollution Control, Vol 73, No 4, p 417-424, 1974.

Descriptors: *Water pollution sources, *Effluents, *Sea water, Phenols, Cyanide, Toxicity, Colloids, Suspended solids, Discharge, *Sewage disposal, Coastal areas, Industrial wastes, Oxidation, Chemical pollution, Dissolved solids, *Waste water disposal.
Identifiers: *Marine disposal systems, Buoyant materials, Settleable solids, Intermediate solids.

Marine disposal should be undertaken as economically as possible consistent with the proper protection of the public health, as well as the minimum damage to amenity, recreational and industrial use of the receiving waters and the minimum waste of natural resources or disruption of the environment. The inland disposal of polluting discharges must inevitably mean disposal into the sea, since waters flowing through almost all lakes, streams and rivers eventually reach the seas. The oceans, it can be assumed, have become progressively polluted with a variety of chemical salts amounting to some 34,000 mg/liter total dissolved solids. Many of the naturally derived chemicals occurring in waste discharges are amenable to sea degradation; acids and alkalis are rapidly dispersed by the sea, while toxics such as phenols and cyanide compounds are rapidly degraded if prior to discharge they have been properly diluted. Buoyant materials are not easily broken down, and by surface wind action are liable to return to the shoreline, creating unsightly pollution. The greatest amount of pollution is discharged in solution or colloidal suspension, including the liquid fraction of sewage and industrial wastes. Stable toxins must not be discharged except as trace contaminants. (Leibowitz-FIRL)
W75-04289

LYSIMETRIC AND CHEMICAL INVESTIGATIONS OF PEDOLOGICAL CHANGES: I. LYSIMETERS AND THEIR DRAINAGE WATERS,
Missouri Univ., Columbia.
For primary bibliographic entry see Field 2G.
W75-04311

EFFECTS OF NATURAL MICROBIAL PREPARATIONS ON THE ELECTROKINETIC POTENTIAL OF BACTERIAL CELLS AND CLAY MINERALS,
New York Univ., N.Y. Dept. of Biology.
L. Kiremidjian, and G. Stotzky.
App. Microbiol. Vol 25, No 6, p 964-971. 1973, Illus.
Identifiers: Agrobacterium-Radiobacter, *Bacterial cells, *Clay minerals, *Electro-kinetics, *Microbial activity, Minerals, Sewage, *Soil treatment, Soil applications.

A complex mixture of fermentation residues and eutrophication products used commercially as a soil amendment and in various phases of sewage treatment was effective in reducing the electrophoretic mobility of clay minerals (kaolinite and montmorillonite) and cells of Agrobacterium radiobacter. The active fraction(s), which is active at very low concentrations, appears to be a stable (to heat, dialysis, concnetration, and storage), net negatively charged polymer which may have several positively charged sites. The material does not significantly alter the viscosity or surface tension of aqueous systems and is probably a microbial metabolite(s).--Copyright 1974, Biological Abstracts, Inc.
W75-04317

HYDRODYNAMIC EFFECTS OF OIL SLICK MECHANICAL CONTROL DEVICES,
Texas A and M Research Foundation, College Station.
For primary bibliographic entry see Field 5G.
W75-04327

MODELS OF DISPERSION IN A GRANULAR MEDIUM,
California Univ., Davis.
For primary bibliographic entry see Field 2F.
W75-04340

SULFATE REDUCTION AND SULFIDE OXIDATION IN FLOODED SOIL AS AFFECTED BY CHEMICAL OXIDANTS,
Army Engineer Waterways Experiment Station, Vicksburg, Miss. Office of Dredged Material Research.
R. M. Engler, and W. H. Patrick, Jr.
Soil Sci Soc Am Proc. Vol 37, No 5, p 685-688. 1973, Illus.
Identifiers: *Anaerobic conditions, *Chemical oxidants, *Flooded soils, Oxidation, Redox, Soils, *Sulfate reduction, *Sulfide oxidation, Sulfur.

The effect of various chemical oxidants on inhibition of sulfide (S2-) in a previously reduced soil was studied. O2, KNO3, MnO2, fericitrophosphate, and FePO4 . 2H2O at rates equivalent to 1000 ppm O2 (O2 added at rates of either 300 or 500 ppm) were both added prior to flooding and after soil reduction had reached a maximum. The more soluble oxidants had the greatest effects in maintaining more positive redox potentials and in delaying sulfate (SO42-) reduction to S2-. The soluble oxidants (KNO3 and fericitrophosphate) delayed S2- production by 17 and 9 days, respectively. The less soluble compounds (MnO2 and FePO4 . 2H2O) were less effective in delaying S2- production but persisted longer in preventing maximum S2- buildup. Adding the oxidants after maximum S2- accumulation showed the most pronounced effect on S2- oxidation from KNO3 and the least effect from MnO2. O2 at the rate of 500 ppm was also a very effective oxidant. Sulfate reduction to S2- and S2- oxidation were apparently controlled by, or at best related to the redox potential since SO42- reduction and S2- oxidation both appeared to commence at potentials in the vicinity of -100 mV.--Copyright 1974, Biological Abstracts, Inc.
W75-04347

CONVERSION OF DDT TO DDD IN FLOODED SOIL,
Bangladesh Agricultural Univ., Mymensingh. Dept. of Soil Science.
Z. H. Bhuiya, and D. F. Rothwell.
Plant Soil. Vol 39, No 1, p 193-196. 1973.
Identifiers: *Anaerobic conditions, *DDD, *DDT, Dechlorination, *Flooded soils, Insecticides,

Microbial, Soil moisture, Water pollution sources, Pesticide residues.

Anaerobic conditions obtained by flooding the soil caused reductive dechlorination of p,p'-DDT and its conversion to p,p'-DDD was enhanced under waterlogged conditions creating or favoring anaerobiosis. The DDT showed recalcitrance in the soil kept at 15% moisture. More o,p'-DDT was lost from the flooded soil. Similar amounts of p,p'-DDE were detected in all of the 3 levels of technical DDT treatments and the concentrations were not significantly different under both aerobic and anaerobic conditions.--Copyright 1974, Biological Abstracts, Inc.
W75-04348

EFFECT OF NITRATE AND SEDIMENT CONSTRAINTS ON ECONOMICALLY OPTIMAL CLAY PRODUCTION,
Illinois Univ., Urbana. Agricultural Experimental Station.
For primary bibliographic entry see Field 4D.
W75-04349

HEAT DISSIPATION FROM TURBULENT OPEN CHANNEL FLOW,
Georgia Inst. of Tech., Atlanta. School of Civil Engineering.
P. G. Mayer, and M. D. Moss.
In: Water For The Human Environment, Volumen IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 492-499. 2 fig, 11 ref. OWRT A-048-GA(1).

Descriptors: *Thermal pollution, *Heat balance, *Turbulent flow, *Heat flow, *Open channel flow, *Cooling, Water cooling, Hydrothermal studies, Heat transfer, Heated water, Turbulence, Energy transfer, Evaporation, Mathematical studies.
Identifiers: *Heat loss, Karman-Prandtl coefficients.

The advantage of using open channel flow for heat dissipation was proposed. It was indicated that the design of rough open channels resulting in highly mixed flows may be a viable alternative to cooling towers and conventional cooling ponds. an examination was made in terms of increased thermal transport due to an increased surface temperature from mixing near the surface in turbulent open channel flow. A determination of the additional thermal transfer to be obtained by mixing was suggested in terms of the evaporative cooling as a function of surface temperature increase. (Jess-ISWS)
W75-04350

5C. Effects Of Pollution

PREDICTION OF RADIOISOTOPE CONCENTRATIONS IN FRESHWATER STREAMS,
Michigan State Univ., East Lansing. Dept. of Fisheries and Wildlife.
For primary bibliographic entry see Field 5B.
W75-03852

EFFECTS OF TEMPERATURE ON THE TOXICITY TO THE AQUATIC BIOTA OF WASTE DISCHARGES-A COMPILATION OF THE LITERATURE,
Utah Water Research Lab., Logan.
E. J. Middlebrooks, M. J. Gaspar, R. D. Gaspar, J. H. Reynolds, and D. B. Porcella.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-239 127, $6.25 in paper copy, $2.25 in microfiche. Publication PRWG105-1, October 1973. 170 p, 1 tab, 1,289 ref. OWRR B-070-UTAH(4). 14-31-0001-3659.

Descriptors: *Thermal pollution, *Toxicity, Bioassay, Temperature, *Water temperature, Bioindicators, *Reviews, *Bibliographies, Aquatic environment, Waste water(Pollution), Laboratory tests, Biota, Water pollution effects.
Identifiers: *Temperature-toxicity relationships, Experimental design.

An extensive compilation and general evaluation of the literature is presented which describes the temperature interaction with toxicity. Recent literature is summarized and made accessible along with a few generalized relationships such that researchers may design studies in a manner that will increase the utility of their results. A detailed indexing system is employed which makes the information contained in the report accessible by author, toxicant, and test organism. Summary tables of the most pertinent literature are also presented for easy subject retrieval. It was concluded that very little uniformity in experimental design is found between experiments on temperature-toxicity relationships, and a generalized summary of the results presented in the literature is essentially impossible because of the inconsistencies in experimental designs. The utilization of standard bioassay procedures is highly recommended, and these procedures should be applied to experimental designs which allow the estimation of parameters related to the theoretical effects of temperature.
W75-03854

FURTHER OBSERVATIONS ON ENDEMIC FLUORIDE-INDUCED OSTEOPATHIES IN CHILDREN,
L.L.R.M. Medical Coll., Meerut (India). Dept. of Human Metabolism.
M. Teotia, and S. P. S. Teotia.
Fluoride. Vol 6, No 3, p 143-151. 1973.
Identifiers: Diagnosis, Endemic areas, *Fluoride, *Fluorosis(Skeletal), *Osteopathies, Human diseases, *Public health.

Fluoro-osteopathy is described in 4 children aged 6 or above. These observations contrast with the concept that skeletal fluorisis cannot develop prior to 10-20 yr of high fluoride intake. The pathogenesis and the mechanism underlying the causation of this disease is discussed on the basis of the occurrence of skeletal fluorosis in growing children. Since skeletal fluorosis is a preventable disorder, it must be recognized or considered in the differential diagnosis of each bone and joint disease in a child residing in an endemic area.--Copyright 1974, Biological Abstracts, Inc.
W75-03909

THE BIOCHEMICAL OXYGEN DEMAND OF FINELY DIVIDED LOGGING DEBRIS IN STREAM WATER,
Oregon State Univ., Corvallis.
S. L. Ponce.
Water Resources Research, Vol 10, No 5, p 983-988, October, 1974. 4 fig, 6 tab, 9 ref.

Descriptors: *Biochemical oxygen demand, *Lumbering, Natural streams, *Wood wastes, *Water pollution effects, *Dissolved oxygen, Leaves, Toxicity, Water pollution, Fishkill, Water pollution sources, Industrial wastes, Water quality, Softwood, Forests, Coniferous trees, Hardwood, Deciduous trees.
Identifiers: Twigs, Needles, Douglas-fir(Pseudotsuga menziesii), Hemlock(Tsuga), Alder(Alnus), Logging residues.

The impact of Douglas-fir needles and twigs, western hemlock needles, and red alder leaves on dissolved oxygen and thus on the quality of mountain stream water was examined. The mean COD, 90-day BOD, and BOD rate coefficients were, respectively, 454 mg 0/g, 110 mg 0/g, and 0.125 for Douglas-fir needles; 947 mg 0/g, 110 mg 0/g, and 0.056 for Douglas-fir twigs; 570 mg 0/g, 200 mg 0/g, and 0.049 for western hemlock needles; and 882 mg 0/g, 286 mg 0/g, and 0.047 for alder leaves. Further analysis showed that the 90-day values for BOD and K (reaction rate coefficient) could be estimated accurately by tests of shorter duration: 20 days for Douglas-fir needles, 20 days for hemlock needles, and 60 days for alder leaves. Leaf material exposed to fluctuating temperature exerted a 5-day BOD 4.0, 2.4, and 4.2 times greater than the standard temperature 5-day BOD for Douglas-fir needles, hemlock needles, and red alder leaves, respectively. The toxicity of a leachate extracted from each species was determined on guppies and steelhead trout fry. The concentration of leachate needed to produce toxic effects was so high that oxygen depletion probably would be responsible for death long before the leachate effect. The results of this study, combined with reaeration and debris accumulation studies, will enable foresters to predict on-site and downstream dissolved oxygen levels with time after the introduction of a known amount of logging slash. (Witt-IPC)
W75-03913

THE THERMAL REQUIREMENTS AND TOLERANCES OF KEY ESTUARINE ORGANISMS,
Maryland Univ., Prince Frederick. Center for Environmental and Estuarine Research.
J. A. Mihursky, V. S. Kennedy, A. J. McErlean, W. H. Roosenburg, and A. J. Gatz.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 073, $6.25 in paper copy, $2.25 in microfiche. Technical Report No 26, Maryland Water Resources Research Center, College Park, (1974), 146p. OWRT A-011-MD(5), A-002-MD(15), 14-31-0001-3020.

Descriptors: *Thermal pollution, Water pollution effects, *Chesapeake Bay, *Water temperature, Data collections, *Estuarine fisheries, Model studies, Bays.
Identifiers: Thermal effects, *Estuarine organisms, Steam electric stations, Pumped-entrainment, *Thermal tolerance, Species diversity indices.

The research program employed temperature as a major variable in exploring effects on estuarine organisms under both single variate and multivariate experimental designs. Laboratory data were developed for 10 species common to the Chesapeake Bay region, using three basic approaches: (1) temperature effects on mortality; (2) temperature effects on performance, and (3) temperature effects on metabolic activity. Multivariate experiments used time as well as temperature as major variables. This latter approach addressed the question of pumped-entrainment effects on organisms contained in steam electric station cooling water supplies. An analysis was also completed on field data dealing with an estuarine fish community response to a thermal discharge from a steam electric station. Various species diversity indices were developed and compared for a two year pre-operational and a two year post-operational period of the steam electric station. Laboratory data demonstrated that under summer conditions, for typical Chesapeake Bay species, approximately 32C tended to be a thermal 'break point', in that temperatures above 32C tended to exceed tolerance limits of the organisms. Results of the multivariate temperature-time experiments on molluscan earlu life history stages (cleavage stages, trochophone larvae and straight-hinged veliger larvae) demonstrated the need for steam electric station operational designs to keep temperature increases and time exposures to a minimum in order to assure maximum survival. The earliest life history stage (cleavage stage) had the greatest sensitivity to increased temperature. Data were used to develop a thermal biotic predictive model for an estuarine system. Application of data in combination with steam electric station design and operating knowledge plus certain other environmental information on the Chesapeake

Bay system was used to provide an ecological basis for a regional planning scheme.
W75-03944

KINETICS OF MICROBIOLOGICALLY MEDIATED TRANSFORMATIONS OF HEAVY METALS IN AQUATIC ENVIRONMENTS,
Cornell Univ., Ithaca, N.Y. Dept. of Environmental Engineering.
For primary bibliographic entry see Field 5B.
W75-03945

AN EXPERIMENTAL BASIS FOR MAXIMAL PERMISSIBLE CONCENTRATIONS OF PATORAN IN SURFACE WATERS, (IN RUSSIAN),
Research Inst. of Labor Protection and Occupational Diseases, Sofia (Bulgaria).
S. P. Novakova, S. Dinoeva, and S. Danon.
Gig Sanit. 38(3): 86-89. Illus. 1973.
Identifiers: Blood, Cell, Enzymes, Equilibrium, Inhibition, Kidney, Liver, Microorganisms, Oxidation, *Patoran, *Pesticide residues, Rat, Respiration, Spleen, Surface waters, *Lethal limit, *Toxicity, *Organoleptic properties, Water pollution effects.

The toxic effect and the permissible concentrations in water of the pesticide patoran (N-4-bromphenl-N'-methyl bromide) were studied. Tests at concentrations of 0.125, 0.25, 0.5, 1, 2, 4, 8 and 16 mg/1 revealed that patoran has an adverse effect on the organoleptic properties of water. A threshold was observed at 0.2 mg/1. Concentrations up to 20 mg/1 did not affect the self-purification of reservoirs. At a concentration of 50 mg/1, patoran prolonged the existence of microorganisms. In acute experiments in rats, the LD50 was 3875 mg/kg. In acute and semiacute experiments, patoran inhibited tissue respiration and oxidative-reductive processes in cells and led to toxic damage to liver, kidneys and spleen, including a tendency toward development of cirrhosis of the liver. Chronic experiments in 210 white rats over a 6 mo. period under 5 experimental conditions at daily doses of 0.1-80 mg/kg revealed that above 0.1 mg/kg, patoran adversely affected white and red blood cells, disturbed enzyme equilibrium, inhibited tissue respiration and cellular oxidation-reduction processes and affected the liver, kidneys and spleen. Changes were dose-related. The limiting sign of damaging effects of patoran is its influence on the organoleptic properties of water. It is concluded that 0.20 mg/1 is the maximum permissible levels of patoran in reservoirs.--Copyright 974, Biological Abstracts, Inc.
W75-03959

LIMNOLOGICAL STUDY OF LAKE SHASTINA, SISKIYOU COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2H.
W75-03982

A SUMMARY AND COMPARISON OF NUTRIENTS AND RELATED WATER QUALITY IN LAKES ERIE, ONTARIO, HURON, AND SUPERIOR,
Burlington (Ontario). Canada Centre for Inland Waters.
For primary bibliographic entry see Field 5B.
W75-04027

THE TOXICITY OF 2, 3, 7, 8-TETRACHLORODIBENZO-P-DIOXIN (TCDD) IN GUPPIES (POECILIA RETICULATUS PETERS),
Forest Service (USDA) Corvallis, Oreg. Forestry Sciences Lab.
L. A. Norris, and R. A. Miller.
Bulletin of Environmental Contamination and Toxicology, Vol 12, No 1, p 76-80, July, 1974. 1 fig, 2 tab, 18 ref.

Descriptors: Fish, *Herbicides, Pollutants, *Toxicity, Chemicals, 2,4,5-T, Brush control, Analytical techniques, Water pollution effects, Mortality, *Path of pollutants, Organic compounds.
Identifiers: *Guppies, *Poecilia reticulatus, *TCDD.

The compound 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is a contaminant of the herbicide 2,4,5,-trichlorophenoxyacetic acid. TCDD is immobile, slowly degraded in soils, not taken up readily by plants, subject to photodecomposition, low in water solubility, and highly toxic and teratogenic in mammals. This experiment determined the characteristics of TCDD in guppies. Exposure of the guppies to 0.1, 1.0 and 10.0 ppb TCDD for 120 hours caused complete mortality in the following 32, 21, and 30 days, respectively. The suggested reason for the apparent decrease in toxicity between 1.0 and 10.0 ppb TCDD is that fish in the 1.0 ppb TCDD concentration may have been exposed to supersaturated levels of TCDD. There was a significant positive correlation of duration of survival with the body length. (Orr-FIRL)
W75-04028

COMPARATIVE BIOCHEMISTRY, BIODEGRADABILITY, AND TOXICITY OF DDT AND CARBOFURAN ANALOGUES,
Illinois State Natural History Survey, Urbana.
R. L. Metcalf, A. Keturah, J. R. Reinbold, W. F. Sanborn, and W. N. Childers.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 252, $4.25 in paper copy, $2.25 in microfiche. Illinois Water Resources Center, Urbana, (UILU-WRC-74-0095), Research Report No. 95, December 1974. 49 p, 3 fig, 11 tab, 19 ref. OWRT B-070-ILL(1). 14-31-0001-3879.

Descriptors: *Biodegradation, Aldrin, *Pesticides, DDT, *Sunfishes, *Toxicity, Biochemistry, Water pollution effects, Pesticide residues.
Identifiers: *DDT analogues, *Methoxychlor, Green sunfish, Trifluralin, *Carbofuran.

The aquatic persistence, toxicity, and biodegradability of DDT, methoxychlor, and 28 analogues were evaluated using the green sunfish Lepomis cyanellus. Study of DDT analogues with degradophores located in aryl or alkyl moieties of the DDT-type molecule showed that the toxicity to and persistence of these compounds in the green sunfish is correlated with the environmental temperature of exposure and ability of multi-function oxidase enzymes of the fish to attack specific chemical groupings on various parts of the molecule. The green sunfish can readily oxidize alkyl and methylthio groups of the aryl portion of the molecule to water partitioning moieties but alkoxy groups are not as readily attacked. Persistent and highly insecticidal DDT molecules can be developed which have greatly reduced toxicity to fish. The biochemical role of the multi-function oxidase enzymes in biodegradation of pesticides in the green sunfish was explored in detail using the oxidase inhibitor piperonyl butoxide together with radiolabeled methoxychlor, aldrin, and trifluralin. The reactions which were inhibited were 0-demethylation, N-dealkylation, and epoxidation. Where piperonyl butoxide was present, the fish accumulated from 15 to 45 times more of the parent compound, over a 16-day period.
W75-04034

ENHANCEMENT OF RECREATIONAL USES OF ESTUARINE WATERS THROUGH STUDY OF POTENTIAL CONTROL METHODS FOR STINGING SEA NETTLES,
Maryland Univ., Solomons. Natural Resources Inst.
D. G. Cargo.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 226, $3.25 in paper copy, $2.25 in microfiche. Maryland Water Resources Research Center, College Park, Technical Report No. 23, (1974). 12 p. OWRT B-002-Md(1). 14-01-0001-1055.

Descriptors: *Sea nettles, Chesapeake Bay, Chrysophyta, Cyanophyta, Water temperature, Food chains, Growth rates, Spawning, Reproduction, Thermal stress, Jelly fish.
Identifiers: *Chrysaora, *Cyanea, Polyps, *Nudibranch, Medusa growth, Ctenophores, Mnemiopsis, Scypistoma.

A number of laboratory and field oriented experiments and observations are described. Temperature tolerance of polyps of the sea nettle showed that they encyst at 4C and again at 35C. Most polyps set on the under sides of substrates. Predation upon polyps by the nudibranch Coryphella pellucida is revealed. Observations on the winter jellyfish showed that this species is seasonally opposite to the summer nettle and has all the same stages. Growth of medusae, variation in seasonal abundance and setting patterns of planula larvae were examined. Maximum growth observed was from 3 mm to 170 mm in 33 days. Peaks of abundance and spawning take place in late July and early August. A laboratory experiment showed that the ctenophore is an acceptable and nutritious food for sea nettles.
W75-04037

ACCUMULATION OF MERCURY BY FISH AND TURTLES OF THE LITTLE PINEY RIVER,
Missouri Univ., Rolla. Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-04040

A CONTINUOUS FLOW KINETIC MODEL TO PREDICT THE EFFECTS OF TEMPERATURE ON THE TOXICITY OF WASTE TO ALGAE,
Utah Water Research Lab., Logan.; and Utah State Univ., Logan. Div. of Environmental Engineering.
J. H. Reynolds, E. J. Middlebrooks, D. B. Porcella, and W. J. Grenney.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 194, $5.25 paper copy $2.25 microfiche. Report PRWG 105-3, June 1974. 112 p. 34 fig, 29 tab, 91 ref., 7 append. OWRT B-070-Utah(5). 14-31-0001-3659.

Descriptors: Water pollution effects, *Bioassay, *Toxicity, Bioindicators, Industrial wastes, *Phenols, *Kinetics, *Mathematical models, *Algae, Temperature, *Thermal pollution, Inhibition, Enzymes, Model studies.
Identifiers: Chemostat, Oil refinery wastes, Enzyme inhibition, Competitive, Non-competitive inhibition, *Selenastrum capricornutum.

Many industries, such as pulp and paper mills, tanneries, and oil refineries, discharge toxic wastes at extremely high temperatures. The temperature of an oil refinery waste may range from 22C (71F) to 41C (106F). These high temperatures could have a significant effect on the toxicity of a given waste. Therefore, it is necessary to develop relationships which will evaluate and predict the effects of increased temperature on the toxicity of various wastes. Equations have been developed utilizing continuous flow stirred tank reactor (chemostat) kinetics and enzyme inhibition kinetics to describe the effects of temperature on toxicity to microorganisms. These equations were tested by semicontinuous and continuous flow experiments with phenol and the algae Selenastrum capricornutum. The data obtained were fitted to competitive, uncompetitive, and non-competitive inhibitor models. The results indicated that phenol exerts a competitive inhibition effect on the growth of S. capricornutum. Comparison of the competitive inhibition constants, KI, for S. capricornutum exposed to phenol at 20C, 24C, and 28C, indicates that phenol toxicity increases with an increase in temperature according to the Arrhenius function.

W75-04052

BIOLOGICAL AVAILABILITY OF SEDIMENT PHOSPHORUS TO MACROPHYTES,
Wisconsin Univ., Madison. Water Chemistry Program; and Wisconsin Univ., Madison. Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W75-04053

THE TOXICITIES OF SEWAGE EFFLUENTS, INDUSTRIAL DISCHARGES AND SOME CHEMICAL SUBSTANCES TO BROWN TROUT (SALMO TRUTTA) IN THE TRENT RIVER AUTHORITY AREA,
Trent River Authority (England). Pollution Control and Fisheries Dept.
F. S. Woodiwiss, and G. Fretwell.
Water Pollution Control, Vol 73, No 4, p 396-405, 1974. 3 fig, 13 tab, 3 ref.

Descriptors: *Water pollution, *Effluent control, *Fishkills, *Industrial wastes, *Trout, Rivers, Toxicity, Sewage effluents, Rainbow trout, *Toxicity, *Brown trout.
Identifiers: *Trent River Authority(UK).

An intensive investigation resulted in the conclusion that unidentified complex organic compounds originating at the chemical manufacturing industry around Loughborough were killing the fish population in the lower part of the Soar River, a tributary of the Trent. A toxicity test was developed between 1965-1969 for an examination of the effluents in the Trent River Authority area. A modified version of the Standard test recommended by the Ministry of Housing and Local Government involved the following procedures: the test species was changed from brown trout to rainbow trout because of the availability and the standard length of 60 and 150 mm for the tested fish; the temperature used during the tests was increased from 10 degrees C to 15 degrees C because of easier attainability; and, the dilution water was standardized, with a choice of either hard (250 mg/liter) or soft (25 mg/liter) water being recommended so that the one which most closely approximates the receiving water can be chosen. Several industrial waste water discharges to sewers were tested on behalf of sewage works to trace the toxicity source in their effluents, or the cause of operational problems such as the inhibition of sludge digestion and the reduced efficiency of aerobic processes. (Leibowitz-FIRL)
W75-04110

THE MORPHOEDAPHIC INDEX, A FISH YIELD ESTIMATOR--REVIEW AND EVALUATION,
Ontario Ministry of Natural Resources, Thunder Bay. Fish and Wildlife Research Branch.
R. A. Ryder, S. R. Kerr, K. H. Loftus, and H. A. Regier.
Journal of the Fisheries Research Board of Canada, Vol 31, No 5, p 663-688, May, 1974. 6 fig, 107 ref.

Descriptors: *Dissolved solids, *Yield equations, *Fish populations, Statistics, Depth, Reviews, Evaluation, Estimating.
Identifiers: *Morphoedaphic index, Angling yield, Commercial fish yield, Mean depth.

The morphoedaphic index (MEI), a fish yield estimator, was reviewed and evaluated. Background papers leading to the development of the MEI and more recent advances were discussed. The MEI was defined and its criteria for use examined. The significance of its components - total dissolved solids and mean depth - was explained. A comparison between the MEI and related models was also made. The global range of the MEI was outlined as well as restrictions on its use. Sustained fish yields at different MEI values for various climatic regions were predicted. Several special applications of the MEI include: prediction of angling yield in north-temperate lakes; prediction of commercial fish yield on a newly created reservoir; indication of ecological stresses and changing environments; and contrasting responses to cultural eutrophication in the littoral and profundal zones of lakes. The implications of the MEI for ecological theory were discussed. (Orr-FIRL)
W75-04116

MICROBIOLOGY OF WASTE TREATMENT, (LITERATURE REVIEW),
Pennsylvania State Univ., University Park.
For primary bibliographic entry see Field 5D.
W75-04117

INTERACTIONS BETWEEN LIGHT AND CARBON DIOXIDE AVAILABILITIES AS A CONTROL OF ALGAL SPECIES SUCCESSION,
Missouri Univ., Columbia. Dept. of Civil Engineering.
D. L. King, and R. King.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 284, $4.75 in paper copy, $2.25 in microfiche. Missouri Water Resources Research Center, Columbia, Completion Report, June 17, 1974. 74 p, 32 fig, 6 tab, 14 ref, 2 append. OWRT A-071-MO(2). 14-31-0001-4025.

Descriptors: *Algae, *Carbon dioxide, Light, *Photosynthesis, *Growth rates, Anabaena, Scenedesmus, *Algal control.
Identifiers: *Algal species succession, Pediastrum biradiatum, Phormidium.

The primary objective was to evaluate the role played by the interaction between light availability and a carbon dioxide source for algal photosynthesis. Algae used included Pediastrum biradiatum, Phormidium olivacea, Anabaena variabilis, and Scenedesmus acutiformis. The growth kinetics of all four algae were shown to follow the Mowod model under high free carbon dioxide concentrations (CO2f) and variable light intensity, but under high light intensity and variable CO2f the growth kinetics fit the Monod model well only at high CO2f. However, the limit on specific growth rate imposed by CO2f availability and the limit imposed by light intensity were shown to interact in a multiplicative manner for all four algae. While correlation coefficients between measured and calculated specific growth rates for the four algae ranged from .96 to .99; each alga differed in its ability to compete under conditions of changing light and changing CO2f as well as under variations in the product of these two variables.
W75-04148

POLLUTION POTENTIAL OF AQUATIC SEDIMENTS,
Missouri Univ., Rolla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5B.
W75-04150

SYMPOSIUM ON POPULATION EXPOSURES,
Health Physics Society, East Weymouth, Mass.
Available from the National Technical Information Service, Springfield, Va. 22161, as CONF-741018, $10.60 in paper copy, $2.25 in microfiche. CONF. 741018 Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, Oct 21-24, 1974, Knoxville, Tennessee, 446 p.

Descriptors: *Public health, *Radioactivity, *Nuclear powerplants, *Energy, Physics, Radiation effects, *Human population, Environment, Environmental effects, Path of pollutants, Measurement, Assessment, Safety, Evaluation, Fuels, Gases, Waste disposal, Hazards, Toxins, Toxicity.
Identifiers: *Population exposure.

The Eighth Midyear Symposium provided an opportunity for consideration and discussion of technical questions involving (i) potential adverse effects that the nuclear power industry may have on the environment, (ii) pathways that various radionuclides follow in the biosphere when released in air or water, (iii) the relationship of such information to other radiological hazards, and (iv) environment problems associated with the alternative fossil-fuel production of electricity. Although the primary emphasis is on radiation, exposure to non-radioactive environmental pollutants resulting from power generation was also discussed. (See W75-04153 thru W75-04194) (Houser-ORNL)
W75-04152

THE HISTORICAL DEVELOPMENT OF CONCEPTS OF RADIATION DOSE COMMITMENT,
Office of Radiation Programs, Washington, D.C.
A. C. B. Richardson.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 1-8, 19 ref.

Descriptors: *Radioactivity, *Human population, Mathematics, *Public health, Nuclear explosions, Fallout, Environment, Safety, Evaluation, Assessment.
Identifiers: Dose, *Dose commitment, Weapons testing, *Population exposure.

Calculations of future doses to individuals from ingested radioactive materials, both for estimating the consequences of radiopharmaceutical use and in connection with occupational exposure guidance, provide the firs examples of the use of the concept of dose commitment. In 1958 Lindell introduced expanded concepts which later developed into the United Nations Scientific Committee on the Effects of Atom Radiation (UNSCEAR) definition of 'dose commitment' in order to provide a measure of the public implication of fallout from atmospheric weapons testing. Recently, even broader concepts, variously termed the 'environmental dose commitment' and the 'collective dose commitment,' have been developed which encompass the total population impact of environmental levels of radioactive materials. The historical development, interrelationship, and functions of these concepts are examined with a view to defining their most useful present roles in radiation protection. (See also W75-04152) (Houser-ORNL)
W75-04153

THE USE AND MISUSE OF POPULATION EXPOSURES IN RADIATION PROTECTION,
Environmental Protection Agency, Research Triangle Park, N.C.
P. C. Tompkins.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 9-16, 2 tab, 7 ref.

Descriptors: *Radioactivity, *Human population, *Public health, *Environment, Radioactivity effects, Environmental effects, Safety, Evaluation, Assessment, Technology, Assay, Fallout, Nuclear Explosions, Air pollution, Water pollution, Food chains.
Identifiers: *Dose, Weapons testing.

Estimates of population doses to ionizing radiation have been made by official and unofficial groups for at least 25 years. The general use of such estimates falls in two categories (1) establish the relative importance of different sources of population exposure to radiation and (2) technology assessment. The concept of the Dose Commitment was introduced by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) in 1962 as a basis for evaluating the public health significance of fallout from nuclear weapons testing and is defined as the population dose accumulated over 'infinite' time associated

with one unit of practice. Using appropriate transport, uptake of physiological models, the integral dose to relevant tissues was calculated and the resulting estimate is representative of the mean dose to relevant tissues of the world population associated with complete decay of relatively long-lived nuclides such as 90Sr and 137Cs. (See also W75-04152) (Houser-ORNL)
W75-04154

CONSIDERATION OF BACKGROUND IN DEVELOPMENT OF ENVIRONMENTAL STANDARDS,
Georgia Inst. of Tech., Atlants. Office of Interdisciplinary Programs.
For primary bibliographic entry see Field 5G.
W75-04155

DATA NEEDS FOR THE ASSESSMENT OF POPULATION DOSE FROM BACKGROUND RADIATION,
Health and Safety Lab. (AEC), New York.
For primary bibliographic entry see Field 5A.
W75-04156

THE USE OF AN AUTOMATED POPULATION DATA BASE IN POPULATION EXPOSURE CALCULATIONS,
Office of Radiation Programs, Silver Spring, Md. Electromaganetic Radiation Analysis Branch.
For primary bibliographic entry see Field 5A.
W75-04157

THE USE OF ENVIRONMENTAL MONITORING DATA IN DETERMINING BACKGROUND RADIATION DOSES,
Health Physics Society, East Weymouth, Mass.
For primary bibliographic entry see Field 5A.
W75-04158

ENVIRONMENTAL RADIATION MEASUREMENTS USING IN SITU AND CORE SAMPLING TECHNIQUES,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5A.
W75-04159

POPULATION EXPOSURE TO NATURAL RADIATION BACKGROUND IN PUERTO RICO,
Puerto Rico Nuclear Center, Rio Piedras.
For primary bibliographic entry see Field 5B.
W75-04160

TEMPORARY BODY BURDENS IN DOSE-EFFECT STUDIES OF THE BRAZILIAN AREAS OF HIGH NATURAL RADIOACTIVITY,
Pontificia Universidade Catolica do Rio de Janeiro (Brazil); and Universidade Federal do Rio de Janeiro (Brazil).
L. E. Gonzales, C. C. Ribeiro, H. Mosse, T. H. Cullen, and W. C. Pfeiffer.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 61-72, 5 fig, 1 tab, 24 ref.

Descriptors: *Radioactivity, *Radioactivity effects, *Human population, *Sands, *Background radiation, Analytical techniques, Food chains, Diets, Epidemics, Epidemiology, Chromosomes, Cytological studies, Thorium, Uranium, Lead, Model studies.
Identifiers: *Brazil.

To investigate the possible dose-effect relationship of populations subjected to chronic, low level ionizing radiation, a multifaceted radiological analysis of the high background area in Guarapari is under way. Although its 12,000 population will not exhibit epidemiological manifestations, elevated rates of chromosome aberrations in the peripheral lymphocytes are observed when compared to a control population with a similar water and food supply. The chromosome break structure and the local presence in Guarapari of monazite sand containing up to 6% thorium and 0.3% uranium suggest an inhaled contamination due to alpha emitting radionuclides. A compatible study in a Rio de Janeiro gas mantle (Th02) factory was initiated to calibrate in an average way, the highly varying radiation environment of Guarapari. Here, 212Pb attached to submicron aerosols give concentrations up to 4 pCi/l of air, and workers in this type of environment are observed to have chromosome aberrations rates higher than Guarapari. The resulting temporary body burdens have been assessed by extensive whole-body counting as a function of average air quality and time spent in and out of the factory. It shows daily variations with associated air concentrations, partial decay during off work hours and complete decay to individual backgrounds over a weekend period. A generalized phantom capable of modeling a wide variety of internally distributed radionuclides was developed to calibrate these temporary body burdens. Preliminary results for the average dose/work-year delivered to the cellular fraction of the blood as a critical organ are presented, and its implication on the cytogenetic and Guarapari studies are discussed. (See also W75-04152) (Houser-ORNL)
W75-04161

ENTRAINMENT OF STRATOSPHERIC TRITIUM: ANOTHER RADIOLOGICAL ANOMALY OF THE ROCKY MOUNTAIN WEST,
NUS Corp., Rockville, Md.
For primary bibliographic entry see Field 5A.
W75-04162

AS LOW AS PRACTICABLE: A CRITICAL APPRAISAL OF POPULATION HEALTH RISKS FROM POWER PLANT EFFLUENTS,
Brookhaven National Lab., Upton, N.Y.
For primary bibliographic entry see Field 5A.
W75-04163

A REVIEW OF EFFLUENTS, GENERAL POPULATION DOSES, AND OCCUPATIONAL DOSES RESULTING FROM COMMONWEALTH EDISON'S USE OF NUCLEAR POWER,
Commonwealth Edison Co., Chicago, Ill.
For primary bibliographic entry see Field 5B.
W75-04164

TRENDS IN POPULATION RADIATION EXPOSURE FROM OPERATING BWR GASEOUS EFFLUENTS,
Office of Radiation Programs, Washington, D.C.
For primary bibliographic entry see Field 5B.
W75-04165

POPULATION EXPOSURE ESTIMATES AS DERIVED FROM AN ENVIRONMENTAL ASSESSMENT OF LWR FUEL CYCLE FACILITIES. PART I: POPULATION DOSES FROM OPERATING FACILITIES,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
W75-04166

POPULATION EXPOSURE ESTIMATES AS DERIVED FROM AN ENVIRONMENTAL ASSESSMENT OF LWR FUEL CYCLE FACILITIES, PART II: LONG-TERM POPULATION DOSES FOLLOWING CESSATION OF PLANT OPERATIONS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
W75-04167

DETERMINATION OF GAMMA-RAY EXPOSURE IN THE VICINITY OF A BOILING WATER POWER REACTOR,
Atomic Energy Commission, New York, New York, Health and Safety Laboratory.
For primary bibliographic entry see Field 5A.
W75-04168

PROJECTIONS OF RADIOACTIVE WASTES FROM THE NUCLEAR FUEL CYCLE,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
W75-04169

EFFECT OF STACK HEIGHT ON INDIVIDUAL AND POPULATION DOSES ATTRIBUTABLE TO GASEOUS EFFLUENTS FROM A MODEL FUEL REPROCESSING FACILITY,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5A.
W75-04170

C-14 GASEOUS EFFLUENT FROM PRESSURIZED WATER REACTORS,
New York State Dept. of Health, Albany. Radiological Sciences Lab.
For primary bibliographic entry see Field 5A.
W75-04171

DOSIMETRY OF INTERNAL EMITTERS FOR POPULATION EXPOSURE,
Oak Ridge National Lab., Tenn.
W. S. Snyder.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 235-250, 6 fig, 3 tab, 22 ref.

Descriptors: Radioactivity, *Radioactivity effects, *Fallout, *Air pollution, *Water pollution, *Food chains, Diets, Milk, Foods, Social aspects, Economics, Cesium, Iodine, Strontium, Retention, Potable water, *Human population.
Identifiers: Age effect, Dose rate.

A population consists of fetuses, infants, children, adults, and the aged, yet the dosimetry of internal emitters for a population is usually based on the dose appropriate for an adult. This paper examines in some detail whether or not this practice is justified. The dimensions of the body and the masses of the organs vary by an order of magnitude or more with age; this changes the dose rate per photon by one or two orders of magnitude. The dose rate from electrons and alpha particles is generally inversely proportional to the mass of the organs; this also produces differences of an order of magnitude or more in different individuals. Fortunately, intakes of air, fluids, and food are, to some extent, proportional to body mass. However, if contamination is limited to water, milk, or certain foodstuffs, differences of intake with age or with socio-economic groups may be present. Additionally, there are differences in retention of the various radionuclides and their compounds which may greatly influence the total dose received. There is considerable evidence that infants and children have a shorter cesium and iodine biological half-time than adults. Changes of retention with age are indicated also for strontium, although the net effect is not so clear. Judged by the data on fallout, the net effect of dietary factors and retention does not appear large--perhaps a factor of two in the total dose received, except for iodine. However, for short-term intake the difference may be larger. (See also W75-04152) (Houser-ORNL)
W75-04172

MEASUREMENT OF ABSORBED FRACTIONS FOR PHOTON SOURCES DISTRIBUTED UNIFORMLY IN VARIOUS ORGANS OF A HETEROGENEOUS PHANTOM,
Oak Ridge National Lab., Tenn.

For primary bibliographic entry see Field 5A.
W75-04173

DECAY SCHEME DATA FOR RADIATION DOSE CALCULATIONS,
National Environmental Research Center, Las Vegas, Nev.
For primary bibliographic entry see Field 5A.
W75-04174

A METABOLIC MODEL FOR WHOLE BODY AND GI TRACT RETENTION IN A HUMAN INFANT DEDUCED FROM EXPERIMENTAL DATA ON SUCKLING RATS ADMINISTERED A SINGLE ORAL DOSE OF CERIUM-141 AT DIFFERENT AGES,
Oak Ridge National Lab., Tenn.
S. R. Bernard.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 267-274, 6 fig, 4 ref.

Descriptors: *Radioactivity, *Cerium, *Air pollution, *Water pollution, Absorption, *Human population, *Food chains, Retention, Radioactivity effect, Research and development, Model studies, Biology, Metabolism.
Identifiers: Population exposure, Dose, Inhalation, Ingestion, Age effect, GI tract.

Inaba and Lengemann (1972) administered single oral doses of 141Ce(NO3)3 via a stomach tube to nonfasted rats of ages 0, 7, 14, and 25 (weaned) days. They measured total body retention in all pups and GI tract retention in the pups dosed at birth. Over an interval of one month, when there is negligible loss of 141Ce from organs in the total body minus the GI tract and contents, the fractional retention in the total body is approximately given by the complement of a 20-term, cumulative, Poisson function, plus a constant. For fractional retention in the gut and contents, a formula is given which assumes permanent fixation of a fraction fg(A) in the gut walls. The parameters fg(A) and lambda A depend on the age at the time of administration of the 141Ce(NO3)3. In the formula, (lambda A t) to the 0 power for t = 0 is taken as unity. The model has been extrapolated to human retention. Dose has been estimated for a single intake of 1 micron Ci of 141Ce(NO3)3, assuming complete absorption of beta energy in the walls. The dose was about 6 rad if ingestion occurred at birth. The retention in the gut wall was taken as constant after 180 days, but the dose due to this retention was about 0.03 rad. The model and the dose estimate and its uncertainties are discussed. (See also W75-04152) (Houser-ORNL)
W75-04175

AGE FACTORS FOR DOSE RATES FROM AN INFINITE CLOUD OF A PHOTON EMITTER,
Oak Ridge National Lab., Tenn.
J. W. Poston, W. S. Snyder, and G. G. Warner.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 275-282. 4 fig, 2 tab, 5 ref.

Descriptors: Radioactivity, *Radioactivity effects, *Krypton, *Xenon, *Assessment, Age, Growth stages, Human population, Public health, Research and development, Model studies, Biology, Biocontrol.
Identifiers: Infinite cloud, Photons, *Population exposure, *Dose rate, *Age effect.

Estimates of dose to many of the various organs of the body have been given for an adult immersed in an infinite cloud of a photon emitter (Health Phys. 26, 287, 1974). Similar results are now available for phantoms representing individuals of ages 0 (newborn), 1, 5, 10, and 15 years of age. The ratio of the dose rates received per microcurie-hour of exposure of the younger individuals to that for the adult is examined. The results can be expressed as a set of curves, one for each target organ, and for the different ages. In general, the ratios are higher for the younger individuals and for the newborn are frequently higher by a factor of 10 or more. There are a number of departures from this simple generalization which can be interpreted in terms of depth of the organ below the surface of the body, photon energy, etc. These curves are convenient for calculation of the doses received by various segments of the population or for estimation of the average dose received by a population from an infinite cloud source. Examples are given for 85Kr and 133Xe. (See also W75-04152) (Houser-ORNL)
W75-04176

THE EFFECT OF DEPOSITION VELOCITIES ON ESTIMATES OF ENVIRONMENTAL TRANSPORT AND POPULATION DOSES,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5A.
W75-04177

LOW LEVEL POPULATION EXPOSURE MEASUREMENTS USING THERMOLUMINESCENT DOSIMETERS,
Eastern Environmental Radiation Facility, Montgomery, Ala.
For primary bibliographic entry see Field 5A.
W75-04178

FIELD TESTING OF TSEE DOSIMETERS FOR PERSONNEL MONITORING,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5A.
W75-04179

HEALTH EFFECTS OF FOSSIL FUEL POWER PLANTS,
Brookhaven National Lab., Upton, N. Y.
L. D. Hamilton, and S. C. Morris.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 305-316. 4 tab, 14 ref.

Descriptors: *Electric powerplants, *Fossil fuels, *Effluents, *Environment, *Coals, Effects, *Air pollution, *Water pollution, Public health, Assessment, Evaluation, Morbidity, Mortality, Epidemiology, Research and development.
Identifiers: Fuel cycle.

Most efforts to estimate national health and environmental effects of the energy system or their costs have proceeded from an overall estimate to an allocation of these costs to different portions of the energy system. Such analyses have not been realistic because they have not taken into account the varying ways in which emissions and resource uses produce effects; moreover, they have not been representative enough of local diversities. The Biomedical and Environmental Assessment Group of Brookhaven National Laboratory (BEAG) will estimate effects in specific circumstances, taking into account known variables, that will then be aggregated for national estimates. Each portion of the energy system will be analyzed and associated with a set of 'effects modules', i.e., effects common to different stages of various energy alternatives. Then, because the effects which result depend upon local conditions, appropriate sets of representative regions will be developed (about 20 for the U.S.). Effects estimates will be made for these regions and summed to obtain national estimates. (See also W75-04152) (Houser-ORNL)
W75-04180

COMPARATIVE POPULATION RADIATION DOSE COMMITMENTS OF NUCLEAR AND FOSSIL FUEL ELECTRIC POWER CYCLES,
Office of Radiation Programs, Washington, D.C.
J. E. Martin.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 317-326, 2 fig, 1 tab, 9 ref.

Descriptors: *Nuclear powerplants, *Fossil fuels, *Effluents, *Electric power production, Human population, Public health, Radioactivity effects, Coals, Uranium, Carbon.
Identifiers: Nuclear fuels, *Fuel cycle, *Population exposure.

Past comparisons of the radiological impact of electricity generation by fossil and nuclear fuels have focused on doses to individuals from the power plants and have excluded impacts from the total cycle on the total population. A comprehensive perspective of the radiological impact of a decision to generate electricity by one means or the other is properly based on the total fuel cycle impact and the long-term total effects (environmental dose commitments) on populations. This comparison, using the Biological Effects of Ionizing Radiation (BEIR) Committee data, is made between a typical light-water reactor uranium fuel cycle and a typical coal fuel cycle, which discharges trace amounts of naturally-occurring radioactivity. When compared on this basis the uranium fuel cycle population impacts are found to be predominately from long-lived radionuclides discharged in supporting parts of the cycle; the population impact from the coal cycle is primarily at the power plant. However, the introduction of nonradioactive carbon by coal combustion represents an offsetting factor, per unit of electricity produced, in that it reduces the environmental dose commitment of carbon-14 generated and released by the nuclear fuel cycle. On the basis of radiological impact alone, the long-term population impact of the nuclear fuel cycle appears to exceed that of the coal fuel cycle by a significant margin. (See also W75-04152) (Houser-ORNL)
W75-04181

CONDOS-A MODEL AND COMPUTER CODE TO ESTIMATE POPULATION AND INDIVIDUAL RADIATION DOSES TO MAN FROM THE DISTRIBUTION, USE AND DISPOSAL OF CONSUMER PRODUCTS THAT CONTAIN RADIOACTIVE MATERIALS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
W75-04182

POPULATION EXPOSURE FROM HIGH-ENERGY ACCELERATORS,
California Univ., Berkeley. Lawrence Berkeley Lab.
L. D. Stephens, R. H. Thomas, and S. B. Thomas.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 333-346, 7 fig, 2 tab, 31 ref.

Descriptors: *Nuclear energy, Facilities, Operations, *Radioactivity, *Kinetics, *Neutron absorption, Radiation, Human population, Public health, Air pollution, Water pollution, Ion transport, Properties, Safety, Evaluation.
Identifiers: *Accelerators, *Personnel exposure, High-energy.

There is increasing interest in estimating the magnitudes of population exposure due to the operation of nuclear facilities. The population exposures that might result from high energy accelerators are described. External whole body radiation is the dominant type of radiation exposure, while exposure resulting from the leakage of radionuclides into the atmosphere or ground water is negligible. At large distances from operating accelerators, neutrons are the predominant form of radiation. The transport of high-energy neutrons through the atmosphere is not well understood at distances greater than about 1000 meters from the radiation

source. Consequently, estimates of population exposure out to distances of 80 km from high energy accelerators may be quite inaccurate. It is extremely important that health physicists and administrators be aware of the limitations of estimates of population exposure. A model is described which facilitates the estimation of population exposure due to accelerators and its limitations are discussed. Suggestions are made for experimental investigations which would improve the model. (See also W75-04152) (Houser-ORNL)
W75-04183

ESTIMATION OF THE DOSE EQUIVALENT TO THE U.S. POPULATION FROM RADON IN LIQUIFIED PETROLEUM GAS,
Texas Univ., Houston. School of Public Health.
For primary bibliographic entry see Field 5A.
W75-04184

RADIATION DOSE FROM NATURAL GAS VS. THAT FROM NUCLEAR STIMULATED NATURAL GAS,
Georgia Inst. of Tech., Atlanta. Office of Interdisciplinary Programs.
For primary bibliographic entry see Field 5A.
W75-04185

LARGE SCALE NUCLEAR GAS STIMULATION: POPULATION DOSES ESTIMATED IN THE ENVIRONMENTAL ASSESSMENT OF CARBON-14 RELEASES,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5A.
W75-04186

PHILOSOPHY AND METHODOLOGY OF ASSESSMENT OF RADIATION DOSES TO POPULATIONS FROM COMBUSTION PRODUCTS OF PLOWSHARE NATURAL GAS,
Oak Ridge National Lab., Tenn.
C. J. Barton, R. E. Moore, and P. S. Rohwer.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 369-374, 18 ref.

Descriptors: Nuclear explosions, *Secondary recovery(Oil), *Natural gas, *Radioactivity, *Tritium, *Krypton, Carbon, *Human population, Environmental effects, Public health, Absorption, Path of pollutants, Food chains.
Identifiers: *Population exposure, Consumer products, Inhalation, Carbon-14.

Methods of assessing radiation doses (hereafter referred to as doses) to individuals and to populations that could result from exposure to compustion products of natural gas produced in wells stimulated by use of nuclear explosives have evolved from work on the Gasbuggy project, the first joint industry-AEC project to use a nuclear explosive to increase natural gas production. Tritium was identified as the radionuclide of principal concern; krypton-85 and carbon-14 are the other long-lived radionuclides present. These dose estimations are theoretical in nature, but efforts are made to make them as realistic as possible by obtaining gas usage data from gas transmission and distribution companies. Studies related to the second nuclear stimulation project, Rulison, have provided improved techniques for calculating population doses from both point and area sources through use of computer codes. The only information from the third nuclear stimulation project, Rio Blanco, that is used is wellhead radionuclide concentrations. Attention has focused primarily on tritium (HTO) inhalation and skin absorption doses which are believed to be the critical exposure pathways. Persons exposed in homes to combustion products from unvented appliances such as kitchen ranges are believed to be the critical exposure population. Some attention has been devoted to other exposure pathways, principally those involving ingestion of consumer products by people. Illustrative results are presented for each technique described. (See also W75-04152) (Houser-ORNL)
W75-04187

IRRADIATED FUEL AND CONTROL RODS TRANSPORT FROM A DECOMMISSIONED POWER REACTOR,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5E.
W75-04188

EXPOSURES DURING THE TRANSPORTATION OF RADIOACTIVE MATERIALS,
American Insurance Association, Washington, D.C.
S. M. Fastman.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 383-388, 1 tab.

Descriptors: *Transportation, Materials, *Radioactivity, Risks, *Insurance, Operations research, Accidents, Hazards, *Safety, Evaluation, Regulation, Standards, *Human population, Public health, Waste disposal, Nuclear powerplants.
Identifiers: Personnel exposure, *Population exposure.

Radiation exposure during the transportation of radioactive materials under normal conditions is discussed. This analysis is based on average conditions as to radiation levels outside of packages, shipping distances, exposure times, distances from shipments and the number of people exposed. The radiation risk that develops from transportation accidents involving nuclear materials also is described. The frequency of transportation accidents in general is evaluated. Projections are made to determine the frequency of accident involving radioactive materials. The limits on radiation levels from individual packages of radioactive materials as well as surface contamination restrictions on such packages are described. External radiation exposure levels for truck drivers, freight handlers, and the general public are given for the transportation of unirradiated fuel, irradiated fuel, and solid radioactive waste under normal conditions. The release of radioactivity during accident conditions is also evaluated. An evaluation is given of the consequences of transportation accidents involving shipments of nuclear fuel or solid radioactive waste. Estimates of the amount of radioactive material released in the unlikely event that a container is breached are provided, taking into account engineering assessments of a variety of package designs, actual accident experience, fuel and radioactive waste properties and experience in shipment, reactor operation and storage. (See also W75-04152) (Houser-ORNL)
W75-04189

EXPOSURES TO FIVE TARGET HEALTH HAZARDS,
Occupational Safety and Health Administration, Washington, D.C.
For primary bibliographic entry see Field 5A.
W75-04190

BIOMEDICAL EVALUATION OF LOW FREQUENCY (LONG WAVE) ELECTROMAGNETIC RADIATION ASSOCIATED WITH ELECTRIC POWER TRANSMISSION,
Illinois Univ. Medical Center, Chicago, Ill. School of Public Health.
R. S. Pogrund.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 2-24, 1974, Knoxville, Tennessee, p 395-404, 1 tab, 22 ref.

Descriptors: *Public health, *Hazards, *Electric power, Fossil fuels, Effluents, Nuclear powerplants, *Radiation, *Radioactivity, Operations, Accidents, Fallout, Air pollution, Water pollution, Gages, Inhalation, Safety, Evaluation, Risks, Radioactivity effects, Radio waves, Genetics, Biology, Biological control.
Identifiers: *Nuclear fuels.

Considerable scientific attention has focused on the possible hazards to human health from such sources of electric power as nuclear and fossil fuels. These hazards have been associated with the release of ionizing radiation during normal reactor operation or accident, as well as human inhalation of gaseous and particulate effluents during the burning of fossil fuels. The safety aspects to human health from these sources for generating electric power have and should be emphasized, but the transmission of the end product itself, electric power, deserves a more serious safety consideration. This becomes especially significant when an industrialized society requires an increasing quantity of electric power whose physical lines of transmission may emit non-ionizing electromagnetic radiation. This radiation may be characterized as extremely low frequency (well below the microwave spectrum or the RF fields generated by television, radar, or radio transmitters). Biomedical or psychophysiological data that show subtle effects upon certain populations that may be at risk due to residential proximity to transmission lines, or to genetic susceptability are reviewed. The central nervous system via electroencephalogram (EEG) is cited particularly for the involved resonant frequencies. (See also W75-04152) (Houser-ORNL)
W75-04191

AN EXAMINATION OF DESIGN PARAMETERS IN A FIELD STUDY FOR EXPOSURE EVALUATION,
Eastern Environmental Radiation Facility, Montgomery, Ala.
For primary bibliographic entry see Field 5A.
W75-04192

POPULATION EXPOSURE TO NATURAL TERRESTRIAL GAMMA RADIATION AROUND SELECTED NUCLEAR POWER PLANT SITES,
EG and G, Inc., Las Vegas, Nev.
For primary bibliographic entry see Field 5A.
W75-04193

ASSESSMENT OF PUBLIC RADIATION EXPOSURE IN THE VICINITY OF U.S. AEC SITES,
Division of Operational Safety (AEC), Washington, D.C.
For primary bibliographic entry see Field 5A.
W75-04194

THERMAL POLLUTION PROBLEMS IN POLAND,
Water Economics Research Inst., Warsaw (Poland). Dept. of Water Chemistry and Biology.
J. Dojlido.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 70-75. 1 tab.

Descriptors: *Thermal pollution, *Powerplants, *Water quality, *Environmental effects, Water temperature, Water cooling, Rivers, Lakes, Ecology.
Identifiers: *Poland.

The heat discharge from power plants in Poland is considered an important source of pollution because of the large influence on surface water quality and biocenosis. In the past only a few

power plants worked with open-cooling systems that utilized surface water. Many power plants now being built and planned will use surface water for cooling and this will create an increase in local thermal discharge and in water temperature downstream. This additional heat will accentuate the existing pollution problem. Data presented showed that only one-quarter of Poland's rivers are really clean. Nearly 30% of the rivers are seriously polluted, exceeding all permissible limits, and cannot be used for any purpose unless treated in very sophisticated and expensive ways. Broad research on the influence of thermal discharge on water quality in Poland is being conducted to eliminate adverse effects and to collect a large amount of data that may be used to predict thermal effects on water quality of slow-flowing, shallow rivers. (See also W75-04213) (Humphreys-ISWS)
W75-04218

SOME BIOLOGICAL ASPECTS OF AQUATIC THERMAL DISCHARGES,
Yale Univ., New Haven, Conn. Dept. of Biology.
D. Merriman.
In: Water for the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 154-164. 40 ref.

Descriptors: *Thermal pollution, Marine biology, *Nuclear powerplants, *Ecosystems, *Heated water, Water temperature, Thermal capacity, Biology, Eutrophication, Water properties, Temperature, Aquatic microorganisms, Environment, Environmental effects, Fish, Productivity, Ecology, Entrainment, Aquatic environment, *Connecticut River.
Identifiers: Connecticut River.

Aquatic ecology and thermal effects, industrial and natural were discussed. The specific case of the operation of the Connecticut Yankee Atomic Power Company plant was discussed as a documented pre- and post-operative study (1965-1972) of the ecosystem. Pertinent problems of entrainment and the passage of anadromous fish were outlined, and the conclusion points to the matters of plant siting and the achievement of rational balance between the desirable ecology and the necessary economy. (See also W75-04213) (Henley-ISWS)
W75-04225

THERMAL POLLUTION ASPECTS IN EUROPE,
Ente Nationale per l'Energia Elettrica, Florence (Italy). Compartimento di Firenze.
For primary bibliographic entry see Field 5B.
W75-04226

THERMAL POLLUTION OF THE GREAT LAKES -- A NON-PROBLEM,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 5B.
W75-04231

REJUVENATION OF THE BUFFALO RIVER,
State Univ. Coll., Buffalo. Great Lakes Lab.
R. A. Sweeney.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 445-455. 1 fig, 4 tab, 15 ref.

Descriptors: *Pollution abatement, *Low-flow augmentation, *Phosphates, *Domestic wastes, *Detergents, Sediments, Cooling water, Stagnant water, Chemical analysis, Sampling, Oxygen, Alkalinity, Conductivity, Nitrogen, Chemical oxygen demand, Biochemical oxygen demand, Phytoplankton, Algae, Oil pollution, *New York, Ammonium salts.
Identifiers: *Benthic macroinvertebrates, *Buffalo River(NY).

The improvements observed in the quality of life in the Buffalo River during the past 7 years have exceeded the most optimistic predictions made prior to the initiation of the Buffalo River Improvement Project and the abatement of pollution by industry. The decrease in quantities of phosphates discharged to the river through the removal of phosphates from detergents sold in Erie County also has had a substantial positive impact on the Buffalo River ecosystem. The phosphate content of detergents was limited to 8.7% phosphorus sold after April 1, 1971 and 0.5% after January 1, 1972. Domestic sewage remains the pollution problem in the river. During the past 3 years, this problem has increased. While funding for the improvement of swage treatment plants was available through state and federal agencies, none was secured by the communities presently discharging to the river. Until a comprehensive sewage treatment plan is implemented in the Buffalo River watershed, the full benefits of the water pollution abatement efforts that have been initiated will not be realized. (See also W75-04213) (Schicht-ISWS)
W75-04248

NATURAL PHOSPHATE REMOVAL MECHANISMS IN SOUTH FLORIDA LAKES,
Miami Univ., Coral Gables, Fla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5G.
W75-04250

THE EUTROPHICATION AND POLLUTION OF LAKE PAIJANNE, CENTRAL FINLAND,
Hydrobiological Research Inst., Jyvaskyla (Finland).
K. Granberg.
Ann Bot Fenn, Vol 10, No 4, p 267-308, 1974.
Identifiers: Diversity indices, Effluents, *Eutrophication, *Finland(Lake Paijanne), Lakes, Phosphorus, *Phytoplankton, Pollution, Pulp wastes, Species, Water pollution effects.

The eutrophication and pollution of Lake Paijanne in Central Finland was examined with reference to the primary production. The value of the phytoplankton biomasses and some indicator systems for the assessment of trophic and pollutional status was compared with that of the primary production. The effect of pulp mill effluents on primary production and dark assimilation was examined. A rough model of eutrophication was constructed with the aid of species diversity indices. The saprobity system of Caspers and Karbe was applied to Lake Paijanne, and an attempt was made to estimate the bioactivity of the lake. Results showed that primary production was correlated with the correlated with the mean total P concentration of the growing season, except in those areas where production was inhibited by the pulp mill effluents. Phosphorus is still the factor limiting primary production in Lake Paijanne. The mean phytoplankton biomasses of the growing season correlate well with total P concentration, thus being an index of trophic status. According to the results, the bioactivity of a lake expresses the combined effect of eutrophication and pollution. The course of the eutrophication and pollution of Lake Paijanne was traced.--Copyright 1974, Biological Abstracts, Inc.
W75-04264

THE EFFECT OF SALINITY ON A MARINE AND A FRESHWATER ASCOMYCETE,
Wyoming Univ., Laramie. Dept. of Botany.
D. E. Davidson.
Can J Bot, Vol 52, No 3, p 553-563, 1974.
Identifiers: *Ascomycete, Biomass, Cellular, Ecology, *Lulworthia-medusa, Marine, Metabolism, *Ophiobolus-graminis, Respiration, *Salinity, Sea water, Growth rates.

Lulworthia medusa, the marine isolate, grew significantly better in seawater than in freshwater medium. The growth of Ophiobolus graminis, the freshwater isolate, was reduced by 1/2 when grown in seawater. The growth of both species was similar in natural and artificial seawater. Neither species grew under anaerobic conditions. Warburg reaction indicate that the respiration of the freshwater species is reduced in seawater. The percentage reduction is about equal to the reduced growth in seawater, as compared to freshwater. The respirational rates of L. medusa in sea and freshwater were similar. Yet growth in seawater was much greater than in freshwater. Consequently, it is proposed that the respiratory energy produced in a freshwater environment is utilized for cellular functions other than biomass increase. In contrast to the marine isolate, the metabolic processes of O. graminis are severely affected by seawater. Ecological implications of the findings are discussed.--Copyright 1974, Biological Abstracts, Inc.
W75-04267

SAGINAW BAY: AN EVALUATION OF EXISTING AND HISTORICAL CONDITIONS,
Michigan Univ., Ann Arbor. Great Lakes Resource Management Program.
P. L. Freedman.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB 232-440, $5.75 paper copy, $2.25 microfiche. Report No. EPA-905/9-74-003, April 1974. 137 p, 19 fig, 6 tab, 111 ref, 2 append. EPA Contract No. 68-01-1577.

Descriptors: *Water quality, *Baseline studies, *Aquatic microbiology, Water pollution, *Water pollution effects, Impaired water quality, Thermal pollution, Aquatic environment, Sewage effluents, Industrial wastes, Eutrophication, Phytotoxicity, Turbidity, Sedimentation, Great Lakes, *Lake Huron, *Michigan.
Identifiers: *Saginaw Bay(Mich), Saginaw River.

The water quality in Saginaw Bay has deteriorated from its natural Lake Huron character because of man's overburdening use. Both the physical-chemical and biological characteristics indicate deteriorating conditions and trends. Existing information on Saginaw Bay was compiled and evaluated and its present status was documented. Water quality and trophic status were evaluated with regard to physical, chemical, and biological parameters. Efforts were made to identify the community structure of aquatic plant and animal populations. Further emphasis was placed on the identification and nature of water-quality variations and trends and the impact of contaminant sources on the system. (Gibb-ISWS)
W75-04278

BIOLOGICAL PROCESSES INVOLVED IN POLLUTION OF COASTAL AQUACULTURE WATERS,
Central Inland Fisheries Research Inst., Barrackpore (India).
V. Gopalakrishnan.
In: Indo-Pacific Fisheries Council Proceedings, 15th Session, Wellington New Zealand, October, 18-27, 1972. Section II: Coastal Aquaculture and Environment, Bangkok, 1974. p 1-7, 18 ref.

Descriptors: *Primary Productivity, *Aquaculture, *Estuaries, *Environmental Effects, *Growth Rate, Pollutants, Coastal, Metabolism, Reproduction, Estuarine Fisheries, Shellfish, Commercial Fish, Biochemical Oxygen Demand, Dissolved Oxygen, Plankton, Toxicity, Industrial Wastes, Domestic Wastes.
Identifiers: Coastal Aquaculture.

An analysis of the basic biological processes involved in the pollution of coastal zone waters is presented and the direct and indirect effects of pollution on primary production, metabolism, growth and reproduction are discussed in the context of coastal aquaculture. (Katz)
W75-04281

TOXICITY OF ZINC AND CYGON, APPLIED SINGLY AND JOINTLY, TO ZEBRAFISH EMBRYOS,
New York Univ., N.Y. Dept. of Biology.
R. R. Roales, and A. Perlmutter.
Bulletin of Environmental Contamination and Toxicology, Vol 12, No. 4, p 475-480, October, 1974. 1 fig, 3 tab, 29 ref.

Descriptors: *Zinc, *Embryonic Growth Stage, *Toxicity, *Organophosphoris pesticides, Mortality, Pesticides, Bioassay, Laboratory tests, Lethal limits, Metals, Water pollution effects.
Identifiers: Brachydanio rerio, *Zebrafish, *Cygon, Pollutant interactions.

The interaction of zinc and Cygon, as well as their individual actions, on zebrafish embryos are examined. The 24, 48 and 72 hour median tolerance limits (Tlm) for both substances were determined and it was indicated that the embyros were more resistant to Cygon. Zinc, at low doses, was found to be antagonistic to the toxic action of Cygon on these embryos. At other levels tested, zinc and Cygon may interact additively. (Katz)
W75-04282

PHYTOPLANKTON ENRICHMENT EXPERIMENTS AND BIOASSAYS IN NATURAL COASTAL SEA WATER AND IN SEWAGE OUTFALL RECEIVING WATERS OFF SOUTHERN CALIFORNIA,
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
W. H. Thomas, D. L. R. Seibert, and A. N. Dodson.
Estuarine and Coastal Marine Science, Vol. 2, No. 3, p 191-206, 1975 4 tab, 8 fig, 26 ref.

Descriptors: *Algae, Nutrients, *Nutrient requirements, Water analysis, *Sewage effluents, *Phytoplankton, Nitrogen, Growth rates, *Bioassay, Primary productivity, *California, On-site data collections, Laboratory tests, Surface waters, *Eutrophication, Sewage Treatment, *Fluorescence.
Identifiers: Receiving waters.

Nutrient enrichment experiments with near-shore Southern California surface water showed that nitrogen was the principal nutrient limiting phytoplankton growth. Bioassays of receiving waters taken above major sewage outfalls were carried out using representative Southern California phytoplankton cultures. The bioassays showed that the receiving waters were sometimes stimulatory, and at other times inhibitory, to algal growth. These studies were done using in vivo fluorescence to measure the growth of the algae. In cultures, cell division rates and increases in in vivo fluorescence were comparable and this indicates that fluorescence is a reasonable way of following growth. (Katz)
W75-04283

THE EFFECT OF CADMIUM ON POPULATION GROWTH IN THE GREEN ALGA SCENEDESMUS QUADRACAUDA,
State Univ. of New York, Buffalo. Dept. of Biochemistry.
E. Klass, D. W. Rowe, and E. J. Massaro.
Bulletin of Environmental Contamination and Toxicology, Vol 12, No 4, p 442-445, October 1974. 1 tab, 1 fig, 17 ref.

Descriptors: *Algae, *Cadmium, *Toxicity, *Industrial wastes, Scenedesmus, Heavy metals, Primary productivity, Laboratory Tests, Environmental effects, Water quality, Water quality control, Water pollution effects.
Identifiers: *Scenedesmus quadracauda.

As a result of industrial utilization, cadmium is present in increasing levels in the environment. This study examines the toxicity of cadmium to the freshwater alga Scenedesmus quadracauda. Results of experimentation indicate that there is no significant effect of cadmium on mean population size in concentrations below 6.10 ppb. Significant differences were observed between control media and progressive increases of Cd2+ concentrations. At 6.10 ppb, an inhibitory effect is observed. Severe growth inhibition is observed at 61 ppb; this may be due to enzyme inhibition. (Katz)
W75-04284

EFFECTS OF PHTHALATE ESTERS ON SHRIMP,
Sapporo Medical Coll. (Japan). Dept. of Public Health.
N. Sugawara.
Bulletin of Environmental Contamination and Toxicology, Vol 12 No 4 p 421-424, October, 1974. 1 fig, 1 tab, 6 ref.

Descriptors: Pollutants, *Industrial wastes, *Toxicity, *Lethal limit, Water pollution effects, Invertebrates, Immature growth stage, Mortality, Hatching, Brine shrimp, Environmental effects, *Shrimp.
Identifiers: *Phthalate esters, DEP, DMP, DBP.

Phthalate esters have become increasingly significant as pollutants with the increasing production of plastics. To estimate the toxicity of phthalate esters to freshwater invertebrates, the effect of phthalate esters on hatching of shrimp eggs and the mortality of the nauplius or larvae stage was tested. Toxic order of three tested substances was DBP much greater than DEP greater than DMP. (Katz)
W75-04285

UPTAKE OF CHLORINATED PARAFFINS AND PCB FROM SUSPENDED SOLIDS AND FOOD BY JUVENILE ATLANTIC SALMON,
Fisheries Research Board of Canada, St. Andrews (New Brunswick). Biological Station.
V. Zitko.
Bulletin of Environmental Contamination and Toxicology, Vol 12, No 4, p 406-412, October, 1974. 4 tab, 10 ref.

Descriptors: Polychlorinated biphenyls, *Bioassay, *Atlantic Salmon, *Toxicity aroclor, Laboratory tests, Suspended solids, Pesticides, Mortality, *Absorption, Water pollution effects.
Identifiers: *Bioaccumulation, *Chlorinated paraffins.

Chlorinated paraffins have been suggested as PCB substitutes in many applications. The uptake of chlorinated paraffins with 40% and 70% chlorine, and of PCB with 54% chlorine, by juvenile Atlantic Salmon was described. The preparations were administered in food and absorbed on silica. Results showed that chlorinated paraffins were significantly less accumulated by juvenile Atlantic Salmon than was PCB. Chlorinated paraffins at 10 and 100 micro g/g in food were very likely toxic to juvenile Atlantic Salmon, but additional experiments are required to confirm the conclusion. (Katz)
W75-04286

ACUTE TOXICITY OF A ZINC-POLLUTED STREAM TO FOUR SPECIES OF SALMONIDS,
Colorado Div. of Wildlife, Fort Collins. Fisheries Research Center.
R. B. Nehring, and J. P. Goette, Jr.
Bulletin of Environmental Contamination and Toxicology, Vol 12, No 4, p 464-469, October, 1974. 5 tab, 4 ref.

Descriptors: *Salmonids, *Zinc, *Toxicity, *Bioassay, *Trout, Water pollution effects, Laboratory tests, Rainbow trout, Brown trout, Brook trout, Cutthroat trout, Lethal limit, Streams, Heavy metals, Mine wastes, Water pollution sources, Methodology, Water quality.

Research was done to compare laboratory zinc bioassay results with the toxic effects of a zinc-polluted stream on rainbow trout, and to compare the relative sensitivities of rainbow, brown, cutthroat and brook trout species to zinc. Fish were exposed to different dilutions of water from a stream polluted by zinc for 14 days. The TL50 for rainbow trout was 0.41 mg zinc/liter. TL50 values determined for zinc on brown trout, cutthroat trout and brook trout were 0.64, 0.67, and 0.96 mg/1, respectively. (Katz)
W75-04287

EFFECT OF TURBIDITY ON ALGAL GROWTH,
Illinois State Water Survey, Urbana.
W-C, Wang.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 399, $3.25 in paper copy, $2.25 in microfiche. Circular 121, 1974. 12 p, 8 fig, 5 tab, 22 ref.

Descriptors: *Eutrophication, *Algae, *On-site investigations, *Laboratory tests, *Illinois, Rivers, Sampling, Surveys, Analytical techniques, Evaluation, *Turbidity, Nutrients, Testing procedures, Water analysis, Incubation, Algal control.
Identifiers: *Illinois River(Ill), *Fox River(Ill), Algal growth.

A comparative study was made to determine the effect of water turbidity on algal growth. The growth of algae in Illinois River water which is characterized by turbid conditions and generally void of algal blooms was compared with algal growth in Fox River water which is generally clear except during periods of frequent algal blooms. Bi-weekly water samples were taken from the Illinois River at Peoria and the Fox River at Oswego and at Dayton. Half of each sample was filtered through 0.45 micrometer membrane filter to remove all particulate matter. The filtered portion and the remaining unfiltered sample were separately inoculated, and the algal growth potential of each fraction was determined under various incubation conditions. The experimental results suggest that high turbidity conditions retard algal growth, a light-inhibition effect. In some cases, however, particulate matter appeared to stimulate algal growth. (Humphreys-ISWS)
W75-04306

EXPERIMENTAL DATA FOR HYGIENIC STANDARDIZATION OF DIHYDROPEROXIDE META-DIISOPROPYLBENZE IN SURFACE WATERS, (IN RUSSIAN),
Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad (USSR).
A. G. Ilichkina.
Gig Sanit. Vol 38, No 3, p 108-110. 1973.
Identifiers: Bacterial studies, *Benzene compounds, Chick, Embryos, *Hygienic standards, Microorganisms, Pollution, Rabbit, Rat, Surface waters, *Chemical analysis, Organic compounds, Water quality standards, *Lethal limit, *Toxicity, *Bactericides, Water pollution effects.

Quantitative chemical analysis of dihydroperoxide meta-diisopropylbenzene (DHP-M) was done in surface waters. Stability, stimulating effect on growth of saprophytic microflora, bacteriostatic and bactericidal effects were evaluated. DHP-M had an adverse effect on the process of mineralization of N-containing organic substances. Toxicological studies were done in white rats, rabbits and chick embryos. Concentrations of DHP-M should not exceed 1 mg/l. Toxicological data was the limiting factor.--Copyright 1974, Biological Abstracts, Inc.

W75-04319

PRELIMINARY STUDY OF PHYTOPLANKTON OF LAKE ST. LOUIS, A BROADENING OF THE ST. LAWRENCE RIVER NEAR MONTREAL, QUEBEC, (IN FRENCH),
Montreal Univ., (Quebec). Dept. of Biological Sciences.
E. Alaerts-Smeesters, and E. Magnin.
Can J Bot. Vol 52, No 3, p 489-501. 1974 English summary.
Identifiers: *Canada(Quebec), Dominant species, *Phytoplankton, Rivers, Seasonal, *St. Lawrence River, *Lake St. Louis(Canada).

Samples (17) were collected at regular intervals from Sept. 1970-Dec. 1971 from 4 sites on lake St. Louis; these stations received their water either from the St. Lawrence River, the Ottawa River, or both. For each species and sample of the 178 phytoplankton entities found, the number of cells/liter was estimated. The distribution of plankton organisms at each station as well as the seasonal variation of the major systematic groups and the dominant species, were given.--Copyright 1974, Biological Abstracts, Inc.
W75-04335

MORE STREAMFLOW AFTER A BARK BEETLE EPIDEMIC,
Forest Service (USDA), Ogden, Utah. Intermountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 4C.
W75-04342

5D. Waste Treatment Processes

IMPROVED PROCESS FOR TREATING WATER AND WASTEWATER,
P. Lin.
US Patent No 3,855,125, 7 p, 8 fig, 4 tab, 4 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 1204, December 17, 1974.

Descriptors: *Patents, *Neutralization, *Industrial wastes, *Waste water treatment, Pollution abatement, Water pollution control, Phosphates, Acids, Turbidity, Lime, Calcium carbonate, Calcium sulfate.
Identifiers: Thermal fracture.

A process is disclosed for neutralizing acids in industrial wastes and to remove contaminants such as phosphates, acids and turbidity in wastewater. The steps consist of mixing with the wastewater a material consisting of a core of lime having a shell of distinctly cracked calcium salt derived by heating such material to a temperature above 600 deg C for a period of two to forty minutes and suddenly quenching such material by cooling to room temperature to induce thermal fracture. The distinctly cracked calcium shell then has access channels to the core. The shell is selected from the group consisting of calcium sulphate and calcium carbonate. The next step consists of collecting and separating sludge formed as a byproduct of reaction between the lime core and the contaminants to obtain clean water. (Sinha-OEIS)
W75-03857

OXYGENATION OF WASTE WATER,
P. W. Garbo.
US Patent No 3,855,120, 5 p, 2 fig, 8 ref; Official Gazette of the United States Office, Vol 929, No 3, p 1202, December 17, 1974.

Descriptors: *Patents, *Sewage treatment, *Waste water treatment, *Oxygenation, *Biochemical oxygen demand, Pollution abatement, Water pollution control, Water quality control, Sands.
Identifiers: Slag, Alumina, Feldspar, Granite, Hematite, Coke, Glass.

Sewage or other waste water is passed together with oxygen-containing gas upward through a turbulent mass of solid contact particles. The randomly moving contact particles such as coarse and collide with the pollution solids and effect a fine dispersion of the oxygenating gas throughout the liquid suspension. The pollution solids are thus subjected to attrition by the turbulent mass of contact particles. The fine dispersion of oxygenating gas makes intimate contact with the suspended solids and dissolved solids of the sewage or waste water with the result that its oxygenation is accelerated. The water upflow is regulated not to exceed 500 gallons per minute per square foot of horizontal cross-section of the expanded and turbulent mass of solid contact particles. The oxygenating gas supplied to the process has an oxygen content of at least about 60% by volume, and the BOD-containing water and the oxygenating gas are maintained at elevated pressure higher than hydrostatic pressure while flowing up through the expanded and turbulent mass of solid contact particles. Water rising above the top of the expanded and turbulent mass of solid contact particles is recycled to the bottom of the mass for flow up through the mass at a rate not exceeding 20 volumes of the recycled water per volume of BOD-containing water being supplied to the process. The solid contact particles are selected from the group of materials consisting of sand, alumina, feldspar, granite, hematite, slage, coke and glass. (Sinha-OEIS)
W75-03858

PROCESS AND DEVICE FOR PURIFICATION OF EFFLUENTS CONTAINING PHENOLS AND AMMONIUM SALTS,
Societe pour l'Equipment des Industries Chimiques, Paris (France). (assignee)
P. Marecaux.
US Patent No 3,855,076, 4 p, 2 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 1189, December 17, 1974.

Descriptors: *Patents, Water purification, *Phenols, *Ammonium salts, *Waste water treatment, Pollution abatement, Water pollution control, Evaporation, Effluents, Equipment.
Identifiers: *Caustic alkali, Multi-stage evaporators, Coking plants, Sodium hydroxide.

The purification of effluents containing phenols and ammonium salts especially those derived from coking plants is described. The process comprises adding sufficient caustic alkali to the effluent to convert the ammonium salts with strong acids into ammonia; partially evaporating the resulting liquid mixture to remove as vapor, ammonia and other volatile constituents; incinerating the vapor thus produced; evaporating the remaining liquid to produce vapor and a concentrate; scrubbing the vapor so obtained with a solution of caustic alkali; incinerating the concentrate; and discharging the scrubbed vapor and the products of the incineration. Since all the volatile components and especially ammonia are removed by the preliminary treatment, the liquid which is concentrated by evaporation contains only phenols as volatile products, which, when vaporized, are held back by the scrubbing with caustic alkali solution. Thus the condensate from the evaporation is only practically pure water and only the final concentrate containing the greater part of the impurities needs to be incinerated. The invention includes a device comprising an incineration furnace; a steam boiler; a column for partial evaporation to receive effluent after it has been rendered alkaline; a duct to convey the vapors from the column to the incineration furnace; a multi-stage device for evaporating the liquid, which has means for scrubbing the vapors produced by bubbling them through a solution of caustic alkali; and a duct for conveying concentrate from the multi-stage evaporation device to the incineration furnace. (Sinha-OEIS)
W75-03859

APPARATUS FOR DETERMINING ORGANIC CARBON CONTENT OF POLLUTED LIQUIDS,
For primary bibliographic entry see Field 5A.
W75-03861

PLANT FOR TREATING WATER, IN PARTICULAR SEWAGE OR SLUDGE,
Sulzer Bros. Ltd., Winterhur (Switzerland). (assignee)
E. Bosshardt.
US Patent No 3,854,875, 3 p, 3 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 1135, December 17, 1974.

Descriptors: *Patents, *Sewage treatment, *Irradation, *Waste water treatment, Pollution abatement, Water pollution control, Sludge, Equipment, Microorganisms.
Identifiers: *Gamma radiation, Germs.

The water treatment plant is operated on a batch basis with sludge repeatedly circulated past a source of gamma radiation in order to destroy harmful germs in the sludge batch. After a number of circulations, the batch of sludge is flushed into a collecting vessel for subsequent removal. The sludge batch is passed by the radiation source through a large flow cross-section and at a high flow velocity. The plant achieves a uniform radiation of each batch. (Sinha-OEIS)
W75-03862

SELF-CLEANING FILTER FOR HYDROLOGICAL REGENERATION,
E. S. Perkins.
US Patent No 3,854,291, 3 p, 3 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 929, No 3, p 945, December 17, 1974.

Descriptors: *Patents, Dams, *Water pollution treatment, *Filtration, Pollution abatement, Rivers, *Sewers, *Conduits, Rainfall, *Waste water treatment.

An improved dam system is described wherein polluted water is filtered and the filter is periodically cleaned by automatic backwash due to varying levels of the stream. A plurality of holding dams are mounted in a stream. Each holding dam is formed with a filter portion which receives the principal polluted liquids carried by water tight sewage conduits, which are placed under the stream bed and extend between dams. The sewer conduit supplies its output to a gravity feed filter formed in the dam between its upstream and downstream edges such that the polluted liquid pass through the filter and into conduits which deliver it into the holding pool above the upstream side of the dam. Discharge conduits extend from the holding pool on the upstream side of the dam to the dam and discharge the filtered and purified water to the downstream flow. During periods of unusually high rainfalls the water in the holding pool rises and reaches a level which will cause the discharge conduits through the dam to close and the water will continue to rise and flow over the top of the dam. As the water recedes the head in the holding pool becomes greater than that in the filter and the water passes through the filter in reverse direction, thus backwashing and cleaning the filter. An output from the filter portion of the dam is provided which connects with the underground sewer conduit for the next section of the stream. (Sinha-OEIS)
W75-03864

APPARATUS FOR SEPARATING SOLIDS FROM LIQUIDS,
Ecodyne Corp., Chicago, Ill. (assignee)
W. A. Wachsmuth, and L. Anders.
US Patent No 3,852,199, 4 p, 17 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 929, No 1, p 285, December 3, 1974.

Descriptors: *Patents, *Waste water treatment, Equipment, *Separation techniques, Solid wastes, Pollution abatement, Water pollution control.
Identifiers: *Solid-liquid separation.

A multi-tube settling device is used for separating solids from liquids. It is made from identical, extruded, planar plastic parts. Each part has a series of spaced-apart straight, parallel grooves or slots on one surface. Slots are defined by material integral with planar parts which project perpendicular to the opposite surface. Ribs are dimensioned to be received in the slots. Each rib has an enlarged terminal to fit snugly into the slot. The end ribs are offset slightly toward the center and the end projections are shortened so that the exterior of the device does not have projections which would unnecessarily take up space. Waste is substantially eliminated, and the inner surface of the tubes along which solid particles settle are substantially unobstructed so as to provide minimum interference with the downward flow of the solid particles. (Sinha-OEIS)
W75-03866

METHOD AND APPARATUS FOR USE IN WATER PURIFICATION BY REVERSE OSMOSIS,
Ultrascience, Inc., Skokie IH. (assignee).
E. L. Gibbs.
U.S. Patent No 3,846,295, 4 p, 2 fig, 16 ref; Official Gazette of the United States Patent Office, Vol 928, No 1, p 262, November 5, 1974.

Descriptors: *Patents, *Water purification, *Reverse osmosis, Water quality control, Pollutants, Water pollution control, Pollution abatement, Equipment, Membranes, *Waste water treatment, Water supply.

A method of an apparatus for water purification from raw water by reverse osmosis is described. A reverse osmotic flow is created through a membrane with the concentrate water forming at the input side of the membrane being withdrawn in a pulsed flow. By pulsing the concentrate water flow, the flow is divided into periods of maximum flow and intermediate periods with at least a lesser flow, and may be reduced to no flow. The operating parameters are so determined that the periods of maximum flow involve a sufficient flow to provide adequate flow turbulence over the membrane surface with sufficient flushing to prevent excessive boundary layer formation at the membrane and to maintain particulate material suitably in suspension in the concentrate water. Intermediate periods of lesser or no concentrate flow are so dimensioned as to duration that any boundary layer formation or particulate disassociation resulting during such period is materially countered by the established flow and period duration of the maximum flow period. A very efficient unit for small operations may be produced, utilizing commercially available membrane units, in conjunction with suitable valves in the concentrate water discharge line adapted to be operated by suitable timing devices to provide desirable durations of maximum and intermediate flow periods. (Sinha-OEIS)
W75-03874

LIQUID AERATING APPARATUS,
Solem Machine Co., Rockford, Ill. (assignee).
J. R. Earhart, J. D. Crocker, and J. K. Johnson.
U. S. Paten No 3,836,130, 5 p, 6 fig, 2 ref; Official Gazette of the United States Patent Office, Vol 926, No 3, p 912, September 17, 1974.

Descriptors: *Patents, *Waste water treatment, Pollution abatement, *Aerators, Water pollution control, Water quality control, Equipment, Aeration.

The aerator contains a throat which extends upward. It has an impeller to pump liquid upward through the throat. A diffuser directs the liquid outward in an annular spray patten. The motor is mounted above the diffuser for driving the impeller. An electrical heater extends around the outer periphery of the diffuser. It inhibits the formation of ice when the aerator is operated in freezing temperatures. The heater is in the form of a ring that overlies the upper side of the diffuser outward of the motor. (Sinha-OEIS)
W75-03875

APPARATUS FOR SOLAR DISTILLATION,
For primary bibliographic entry see Field 3A.
W75-03876

HOT BALL DESALINATION PROCESS,
Occidental Petroleum Corp., Los Angeles, Calif. (assignee).
For primary bibliographic entry see Field 3A.
W75-03878

WASTE WATER TREATMENT SYSTEM,
E. T. Armstrong.
U. S. Patent No 3,853,764, 15 p, 14 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 929, No 2, p 774, December 10, 1974.

Descriptors: *Patents, *Sewage treatment, *Waste water treatment, Pollution abatement, Water pollution control, Anaerobic bacteria, Disinfection, Aeration, Oxygenation, Activated sludge, Trickling filters, Microorganisms, Equipment, Treatment.
Identifiers: *Liquid-gas exchange, Gas disinfectants, Settling tanks.

A new concept is presented in liquid processing particularly in sewage treatment utilizing air, oxygen or a carrier fluid with some liquid or gas disinfectant as an attenuator or anaerobic biota, for generalized disinfection, for aeration, or for oxygenation. Unique designs and/or processes are incorporated into the conventional settling tanks associated with sewage treatment, as well as in the bioprocesses, activated sludge or trickling filter operations. The structural improvements in settling reduce velocity, inhibit boundary layer separation and act to suppress mixing of the sewage to greatly enhance solid and fluid separation; the key is to improve efficiency of the liquid-gas exchange whereby much better oxygen contact is achieved. The liquid-gas exchange feature utilizes a high momentum exchange under turbulent flow conditions in a hydraulic pressure gradient to achieve intimate mixing of the desired gas in the fluid so as to achieve the desired liquid-gas exchange. (Sinha-OEIS)
W75-03879

GUIDE TO WATER CLEANUP MATERIALS AND METHODS,
Arthur D. Little, Inc./Learning Systems (Cambridge, Massachusetts), 1974. 335 p.

Descriptors: Pollution abatement, *Treatment facilities, Equipment, *Waste water treatment, *Water pollution control, Planning, *Regulation, Legislation, *Legal aspects, *Instrumentation, Monitoring, Environmental control, Oil spills, Pumps, Chemicals, Additives, Publications, Management, Contracts, Barriers, Engineering structures, Water treatment, Flowmeters, Governments, Water law.

Various waste water treatment and pollution control equipment, such as booms, barriers, skimmers, separators, flowmeters, pumps, oil monitors. and analytical instruments, as well as sorbents and other chemical additives are described. Information is also provided on contingency planning, cleanup contractors, cooperatives, federal and state regulations, and environmental protection agencies. A glossary of terms, useful tables and conversion factors, and an index are appended. (Brown-IPC)
W75-03880

THE ATTEMPTS TO MODIFY THE ACTIVATED SLUDGE PROCESS IN SULPHATE PULP WASTE WATER (IN JAPANESE),
Government Industrial Research Inst., Takamatsu (Japan).
H. Kamishima, and I. Akamatsu.
Japan Tappi, Vol 27, No 9, p 449-456, Sept., 1973. 8 fig, 8 tab, 9 ref. English summary.

Descriptors: *Waste water treatment, *Bleaching wastes, *Pulp wastes, *Color, *Lignins, *Activated sludge, *Ozone, *Activated carbon, Chemical oxygen demand, Organic loading, Biochemical oxygen demand, Laboratory tests, Effluents, Industrial wastes, Pulp and paper industry, Foreign research.
Identifiers: Japan, Kraft mills, Alkaline extraction, Black liquors.

Two approaches to improved decoloring of alkaline extraction effluents from kraft mill bleach plants are reported. In one attempt, activated sludge was acclimatized to dilute black liquor at very low BOD loadings for 1 year. This did not improve the removal of lignin and of COD, while color removal amounted to ca. 20%. In the second study, the effluent was ozonized, which resulted in greatly improved removals of TOC, COD, lignin, and color bodies. Subsequent activated sludge treatment gave adequate removals of BOD components resulting from the ozone treatment. Activated carbon adsorbed very little lignin from ozonized effluents. (Brown-IPC)
W75-03882

STUDIES OF RENOVATION OF PULP MILL WASTE WATER; THE CONDITIONS OF THE PERCOLATION THROUGH ACTIVATED CARBON COLUMN FOR KRAFT PULP LIGNIN (IN JAPANESE),
Government Industrial Research Inst., Takamatsu (Japan).
H. Kabeya, T. Fujii, and Y. Kimura.
Japan Tappi, Vol 27, No 8, p 378-383, Aug, 1973. 3 fig, 5 tab, 9 ref. English summary.

Descriptors: *Waste water treatment, *Pulp wastes, *Adsorption, *Filtration, *Percolation, *Lignins, *Activated carbon, Solids contact processes, Water pollution treatment, Pollution abatement, Color, Waste water(pollution), Industrial wastes, Pulp and paper industry, Laboratory tests, Foreign research, Chemical oxygen demand, Organic loading, Deaeration.
Identifiers: Chemical consumption, Japan, Kraft mills.

The efficiency of lignin removal from kraft mill effluents by passage through fixed-bed activated carbon columns was investigated in laboratory trials. Compared at the break-through point, the weight of carbon needed for downflow operation was 15-30% higher than for upflow treatment. Among deaeration pretreatments for the porous columns, boiling water consumed only 72-75% of the carbon needed after nonboiling water flushing. A theoretical hyperbolic relationship between carbon consumption and contact time was developed and verified experimentally. Effluents collected from the columns at regular intervals were analyzed and found to contain COD/lignin and TOC/lignin ratios of 1.12:1 and 0.73:1, respectively. (Brown-IPC)
W75-03883

ON THE APPLICATION OF POLYELECTROLYTES TO WHITE WATER TREATING BY DISSOLVED-AIR FLOTATION (IN JAPANESE),
Kurita Water Industries Ltd., Osaka (Japan).
Y. Furukawa.
Japan Tappi, Vol 27, No 8, p 384-393, Aug 1973. 11 fig, 5 tab, 18 ref. English summary.

Descriptors: *Flotation, *Waste water treatment, *Pulp wastes, Water pollution sources, Pollution abatement, Water pollution treatment,

*Fibers(Plant), *Suspended solids, Chemicals, Polyelectrolytes, Polymers, Softwood, Hardwood.
Identifiers: *White waters(Paper machine effluents), Flotation aids, Fillers(Pigments), Aluminum sulfate, Polyacrylamide, Polyethylenimine.

Factors affecting the removal of suspended solids, such as pulp fines, fillers, and alum particles, from paper machine white waters were investigated in laboratory tests, using different flotation aids. The floatability of pulp fibers varied with the kind of pulp. Softwood fibers floated less readily than did hardwood fibers. Flotation rates increased when up to 50% filler (based on pulp weight) was present, but was impeded by the presence of alum (aluminum sulfate). For a given hardwood pulp, the efficiency of polyethylenimine and polyacrylamide varied with the manufacturing origin of these preparations. In the presence of filler particles, polyacrylamide was generally more effective. When alum was present, polyethylenimine was superior at alum concentrations of up to 11ppm, but inferior to the polyamide at higher alum levels. The floatability of pulp in the presence of both alum plus filler was poor. The greatest volume of clarified water was obtained with ca. 11 ppm of alum, for which polyacrylamide was a better aid than was polyethylenimine. It is concluded that aluminum sulfate significantly affects the flotation of white water solids, and that the choice of flotation aids depends on the local composition of waste waters to be treated. (Brown-IPC)
W75-03884

USE AND DISPOSAL OF SOLID WASTES FROM PULP AND PAPER PRODUCTION (VYUZITIE A LIKVIDACIA PEVNYCH ODPADOV Z VYROBY BUNICINY A PAPIERA),
Vyskumny Ustav Papier a Celulozy, Bratislava (Czechoslovakia).
R. Borisek, and J. Jaros.
Papir a Celuloza, Vol 29, No 9, p 213-214, 1974. 2 tab, 11 ref.

Descriptors: *Solid wastes, *Pulp wastes, *Waste disposal, *Wood wastes, *Sludge, Lime, Mud, Bark, Sawdust, Wastes, Disposal, Ultimate disposal, Construction materials, Fuels, Soil amendments, Fly ash, Europe, Pulp and paper industry, Yeasts, Carbohydrates, Byproducts, Organic compounds, *Waste treatment.
Identifiers: *Czechoslovakia, Furfural, Xylose, Building boards, Wood particle boards.

Tabulated data are given showing that the pulp and paper industry in Czechoslovakia generates solid waste amounting to 28% of the total pulp produced (calculated by weight). The wastes include sludges from primary and secondary treatment of effluents, lime mud, bark, sawdust, ash, and others. Chemical processing of these solid wastes can yield furfural, xylose, fodder yeast, and fodder extenders. Mechanically processed wastes can be made into particle and construction boards or soil conditioners. Generally, all organic wastes with low moisture content can be burned to generate energy. (Trubacek-IPC)
W75-03886

AN EXAMPLE OF TREATMENT OF EFFLUENTS FROM PAPERMAKING WITH A VIEW TOWARD RECYCLING (UN EXEMPLE DE TRAITEMENT DES EFFLUENTS DE PAPETERIE EN VUE DU RECYCLAGE),
B. Follea.
ATIP (Association Technique de l'Industrie Papetiere) Revue, Vol 28, No 5, p 247-252, 1974. 2 fig, 7 ref.

Descriptors: *Pulp and paper industry, *Recirculated water, *Waste water treatment, *Treatment facilities, *Water reuse, Sewage treatment, Recycling, Water purification, Flocculation, Waste treatment, Chemical precipitation, Wastes, Industrial wastes, Reclaimed water, Waste water(Pollution), Pulp wastes, Water conservation.

The waste water treatment system developed for a 320 ton/day paper mill with two paper machines and one coater is described. The system centers around a flocculator/clarifier and was specifically designed for recycling of clarified water to the mill process water. Tests carried out in developing the system are outlined. (Speckhard-IPC)
W75-03887

MICROFLOTATION, NEW-OLD WATER PURIFICATION TECHNIQUE (MIKROFLOTATION, NYGAMMAL VATTENRENINGSTEKNIK),
K. Roberts.
Kemisk Tidskrift, Vol 86, No 1/2, p 46-48, 1974. 6 fig 7 ref.

Descriptors: *Pulp wastes, *Flotation, *Water purification, *Waste water treatment, Industrial wastes, Waste treatment, Water pollution control, Water pollution sources, Water quality control, Froth flotation, Bubbles, Surfactants, Inhibitors, Supersaturation, Air, Foaming Suspended solids, Carbohydrates.
Identifiers: Xylans, Hemicelluloses.

The application of microflotation to the purification of industrial waste waters, including pulp mill effluents, is described. The process involves supersaturating the waste water with air and then feeding it into a basin at reduced pressure. Tiny bubbles are formed, which carry most of the suspended impurities to the surface. The mechanical and chemical aspects of the process are briefly considered, along with technical possibilities and advantages. Data are included showing the interference of xylan in the process in purifying pulp mill effluents and the elimination of this interference by addition of a surfactant. (Speckhard-IPC)
W75-03888

STUDIES ON THE USE OF OZONE IN WATER AND WASTE WATER PURIFICATION (UNTERSUCHUNGEN ZUR ANWENDUNG VON OZON BEI DER WASER- UND ABWASSERREINIGUNG),
U. Reicherter, and H. Sontheimer.
Vom Wasser, Vol 41, p 369-380, 1973. 3 fig, 7 tab, 19 ref.

Descriptors: *Ozone, *Pulp wastes, *Waste water treatment, *Water purification, *Organic compounds, Degradation(Decomposition), Oxidation, Calcium hydroxide, Chemical precipitation, Natural streams, Humic acids, Water pollution control, Water treatment, Oxygen.

In a study on the use of ozone in oxidative removal of organic substances from waters, a relationship was found between ozone decomposition rate and oxidizing activity. Through ozonization in the presence of calcium hydroxide, a particularly effective removal of organic materials could be obtained. This is explained as being the result of accelerated ozone decomposition in calcium hydroxide solution, as well as of precipitation of partially oxidized organic substances. The radical course of the reaction was confirmed through ozonization of individual substances and isolation of reaction products. The new method was tested on effluent from a pulp mill and on river water with a high concentration of humic acids. (Speckhard-IPC)
W75-03889

CONTROL OF REVERSE OSMOSIS MEMBRANE HYDROLYSIS WITH DYNAMICALLY FORMED WOOD CHEMICAL MEMBRANES,
Institute of Paper Chemistry, Appleton, Wis.
I. K. Bansal, and A. J. Wiley.
Tappi, Vol 57, No 11, p 129-133, Nov., 1974. 5 fig, 4 tab, 4 ref.

Descriptors: *Reverse osmosis, *Sulfite liquors, *Pulp wastes, *Waste water treatment, *Semipermeable membranes, Membranes, Hydrolysis, Tubes, Lignins, Pilot plants, Effluents, Pulp and paper industry, Water pollution control, Waste treatment, Wastes, Industrial wastes, Wood wastes, Membrane processes, Separation techniques, Dynamics.
Identifiers: Cellulose acetate.

The concept of dynamically formed wood chemical membranes was demonstrated for the purpose of extending the capability of commercially available cellulose acetate reverse osmosis modules operating at room temperatures. Two of the reverse osmosis systems employed in these trials were tubular modules, and the third had spiral-wound modules equipped with corrugated spacers. They were operated at 300-600 psig and 35-65 C. Ten tubular and four spiral wound modules had dynamic membranes formed with calcium-base sulfite liquor and were operated at 33-35 C. Data indicated no evidence of membrane hydrolysis over a continuous operation of 7-16 weeks. In a run conducted at higher temperatures, the cellulose acetate membrane in a sand matrix tubular module was periodically coated with soluble wood chemical components contained in certain types of spent pulping liquors. The module was then operated over 280 hr period at 45-65 C. No apparent deterioration in the reverse osmosis performance of the module was observed in terms of the product flux rates and chloride rejections. (Sykes-IPC)
W75-03890

USE OF WASTE CHEMICALS IN KRAFT MILL EFFLUENT TREATMENT,
Finnish Pulp and Paper Research Inst., Helsinki.
W. Jensen, and E. Meloni.
Paper, World Research and Development Number, 1974, p 46, 48-49, 52-54. 14 fig, 5 tab, 17 ref.

Descriptors: *Pulp wastes, *Bleaching wastes, *Waste water treatment, *Wood wastes, *Chemical wastes, Chemicals, Fly ash, Effluents, Bark, Sulfite liquors, Color, Chemical oxygen demand, Costs, Sludge, Industrial wastes, Wastes, Waste treatment, Water pollution sources, Pulp and paper industry, Solid wastes, Coagulation, Chemical precipitation, Filtration, Dewatering.
Identifiers: Aluminum sulfate, Ferrous sulfate.

Pine barking effluent, pine kraft pulp screening effluent, and pine kraft pulp bleaching effluent (caustic extraction stage) were treated with aluminum sulfate, ferrous sulfate, and with fly ash from the burning of spent sulfite liquor. Color reductions of about 90% and COD reductions of about 70% were attainable. Dosages to achieve these effects and cost estimates are given. Fly ash is comparable with, or superior to, lime as a treatment chemical. The volumes of sludge produced are greater than those resulting from mechanical treatments, but those from fly ash are easier to filter. Aluminum and ferrous sulfates produce voluminous sludges which are difficult to filter. (Hansen-IPC)
W75-03891

POSSIBILITIES FOR PURIFYING RECYCLED OR WASTE WATERS FROM PAPER MILLS, TAKING PHYSICAL-CHEMICAL PROCESSES INTO ACCOUNT (LES POSSIBILITES D'EPURATION DES EAUX RECYCLEES OU RESIDUAIRES DES PAPETERIES, COMPTE-TENU DES PROCEDES CHIMICO-PHYSIQUES),
B. Morgeli.
ATIP (Association Technique de l'Industrie Papetiere) Revue, Vol 28, No 5, p 267-274, 1974. 17 fig.

Descriptors: *Pulp wastes, *Water purification, *Recycling, *Waste water treatment, Floccula-

tion, Filtration, Adsorption, Activated carbon, Separation techniques, Solids contact processes, Biological treatment, Economics, Industrial wastes, Wastes, Chemical oxygen demand, Waste treatment, Water pollution sources, Effluents, Pulp and paper industry.

In purifying papermaking effluents, it is advisable to use a combination of physical-chemical processes particularly suited to the materials contained in the effluents. Pilot-plant and industrial-scale tests have shown that combinations of flocculation, filtration, and activated carbon should preferably be previously freed of substances susceptible to biological elimination; otherwise, these substances will clog the surface pores of the carbon. Biological treatment realized prior to adsorption and after flocculation will increase the adsorption of COD substances on the activated carbon, giving better results and the most favorable economic solution. (Speckhard-IPC)
W75-03893

SELECTION OF COAGULANTS FOR TREATMENT OF EXCESS ACTIVATED SLUDGE (VYBOR KOAGULYANTOV DLYA OBRABOTKI IZBYTOCHNOGO AKTIVNOGO ILA),
Vsesoyuznyi-Nauchnyi Planovii Otdel'Bumazhnoi Promyshlennost, Moscow (USSR).
V. A. Fetisov, L. P. Bystrova, and V. A. Mezhevova.
Bumazhnaya Promyshlennost', No 8, p 13-14, August, 1974. 1 fig.

Descriptors: *Activated sludge, *Sludge treatment, *Sewage treatment, *Coagulation, *Chemical precipitation, *Separation techniques, Waste treatment, Wastes, Water pollution sources, Sludge, Water purification, Lime, Waste water treatment, Dewatering, Water pollution control, Filtration, Iron compounds, Aluminum, Fibers(Plant), Calcium compounds, Dewatering.
Identifiers: Coagulants, Ferric sulfate, Aluminum oxide, Titanium dioxide, Ferric chloride.

The replacement of ferric chloride by other chemicals for the coagulation of excess activated sludge was studied. The agents used in experiments, in which coagulation was carried out on sludge mixed with varying amounts of fibers and fillers (from the primary sedimentation tank), included ferric sulfate, alumina, and a mixed coagulant containing 14% ferric oxide, 4% alumina, 1.5% titanium dioxide, and 10-12% insoluble substances. These coagulants, and also ferric chloride, were used with and without CaO. The effectiveness of the coagulants was evaluated by the filtration rate and resistance to filtration of the sludge. A diagram was constructed from which a suitable coagulant and its dose can be determined. When the resistance is low, the sediment can be dewatered without coagulants. The addition of the fiber/filler mixture makes it possible to use less effective coagulants (e.g., ferric sulfate or the mixed coagulant), because such mixtures reduce the filtration resistance of the sediment. (Stapinski-IPC)
W75-03894

BIOLOGICAL PURIFICATION OF EFFLUENTS FROM BLEACHED KRAFT PULP: THE CASE OF LA CELLULOSE DES ARDENNES (EPURATION BIOLOGIQUE D'EFFLUENTS DE PATE KRAFT BLANCHIE: LE CAS DE LA CELLULOSE DES ARDENNES),
M. P. Henri-Robert, and M. Toulemonde.
ATIP (Association Technique de l'Industrie Papetiere) Revue, Vol 28, No 5, p 275-281, 1974. 3 fig, 2 tab.

Descriptors: *Pulp wastes, *Waste water treatment, *Treatment facilities, Water pollution control, Water pollution sources, Activated sludge, Biological treatment, Water purification, Operations, Technology, Operating costs, Pulp and paper industry, Effluents, Europe, Industrial wastes, Biochemical oxygen demand, Suspended solids, Hardwood, Sludge treatment, Pulp and paper industry, Mixing, Discharge(Water).
Identifiers: *Belgium, Kraft mills.

A Belgian paper mill, originally designed for a production of 200 tons/day of bleached kraft hardwood pulp, was ordered not to discharge more than 1400 kg/day of 5-day BOD. Biological purification has always been necessary, and this effort had to be maximized upon increasing mill production to 500 tons/day. After a study, it was decided to proceed with the construction of a second effluent treatment station in parallel with the original one. Dimensions of the second plant were selected so that the combined plants would function via an activated sludge process with low discharge. The second plant differs from the first in both operation and technology. The need for obtaining a 91% yield involved modifications in activated sludge treatment. To improve control, the process includes reactivation of recycled sludge and contact basins with integral mixing. The volumetric charge retained by the two plants is 0.8 kg/cu m/day. A secondary decanter facilitates sludge thickening takes place in the special primary decanter. Suspended solids in the purified effluent average 90 mg/liter. Although biological purification gives an effective reduction in effluent BOD, there are problems connected with sludge disposal. Operating costs are substantial. (Speckhard-IPC)
W75-03895

ON THE SORPTION CAPACITY OF LIGNIN FOR THE EASY- AND DIFFICULT-TO-OXIDIZE COMPONENTS OR RESIDUAL LIQUOR FROM YEAST PRODUCTION (O SORPTSIONNOI EMKOSTI LIGNINA PO LEGKO- I TRUDNOOKISLYAEMYM KOMPONENTAM POSLEDROZHZHEVOI BRAZHKI),
Arkhangelskii Lesotekhnicheskii Institut (USSR).
A. K. Anpilogov, and E. D. Gel'fand.
Izvestiya Vysshikh Uchebnykh Zavedenii Lesnoi Zhurnal, Vol 17, No 4, p 104-106, 1974. 1 fig, 1 tab, 1 ref.

Descriptors: *Lignins, *Pulp wastes, *Waste treatment, Yeasts, Oxidation, Chemical oxygen demand, *Waste water treatment, Water pollution sources, Water pollution treatment, Pulp and paper industry, Industrial wastes, Wastes, Hydrolysis, Sorption, Solids contact processes, Yeasts, Biological treatment, Pollutants, Sulfite liquors.

The sorption capacity of hydrolysis lignin (screened and washed to remove sugars) was determined by passing the residual liquor through a column filled with lignin and analyzing the fractions collected for oxidizability and COD. From the curves of oxidizability and COD reduction as functions of the liquor ratio (flow rate to saturation of lignin), equations were derived from which the degree of liquor purification can be calculated for any initial COD, flow rate, and liquor ratio. The sorption capacity of lignin for the easily oxidized components of the liquor varied within narrow limits and avaraged 195 g oxygen/kg. The total sorption capacity ranged from 795 to 810 g oxygen/kg. The high sorption capacity of lignin for liquor pollutants that are difficult to oxidize could be utilized as an additional treatment in biological purification of residual liquors. (Stapinski-IPC)
W75-03896

TREATMENT OF RESIDUAL SLUDGES: GENERALITIES AND APPLICATIONS IN THE PAPER INDUSTRY (TRAITEMENT DES BOUES RESIDUAIRES: GENERALITES ET APPLICATIONS A L'INDUSTRIE DU PAPIER),
M. Mathian.
ATIP (Association Technique de l'Industrie Papetiere) Revue, Vol 28, No 5, p 253-265, 1974. 8 fig, 3 tab, 4 ref.

Descriptors: *Pulp wastes, *Sludge treatment, *Reviews, Dewatering, Aerobic treatment, Anaerobic digestion, Drying, Flocculation, Chemical precipitation, Heat treatment, Mechanical equipment, Filtration, Incineration, Costs, Centrifugation, Industrial wastes, Sludge digestion, Degradation(Decomposition), *Waste water treatment, Solid wastes, Operating costs, Economics.

Following a brief description of the main characteristics of sludge from waste water clarifying stages, a review is presented of the main steps in sludge treatment. Covered are thickening, aerobic and anaerobic digestion, drying on sand/gravel beds, conditioning with chemical flocculants, thermal conditioning, industrial units for mechanically dewatering (filter presses, twin-belt presses, rotary suction drum filters, and centrifuges), industrial sludge incinerators (Fluidized-bed, multi-tier, rotating-drum, and flash-drying incinerators), and cost of sludge treatment. (Speckhard-IPC)
W75-03898

MILL ACHIEVES MAXIMUM REUSE OF WATER WITH REVERSE OSMOSIS,
M. MacLeod.
Pulp and Paper, Vol 48, No 12, p 62-64, November, 1974. 3 fig.

Descriptors: *Water reuse, *Water conservation, *Pulp and paper industry, *Industrial water, Waste treatment, *Reverse osmosis, *Waste water treatment, *Wisconsin, Biochemical oxygen demand, Industrial wastes, Wastes, Effluents, Membrane processes, Separation techniques, Water pollution control, Reclaimed water.
Identifiers: Fox River(Wisconsin).

Green Bay Packaging Co. operates a tightly closed neutral sulfite semichemical corrugating medium mill at Green Bay, Wisconsin. An essentially closed white water system, liquor combustion plant, white water surge storage system, and full-scale reverse osmosis unit are integrated in such a way that steady operation is expected to result in less than 5 lb BOD/ton of pulp in the mill's discharge to the Fox River. Some difficulties with the membrane support structure have been experienced. The modules have a life expectancy of only about 2,500 hr, failures occuring especially in the 1,500 to 2,500 hr range. (Sykes-IPC)
W75-03899

NEW SCREENING CONCEPT BOOSTS WATER REUSE AT BOXBOARD MILL,
Sweco, Inc., Los Angeles, Calif. Environmental Systems Div.
W. J. Talley, Jr.
Pulp and Paper, Vol 48, No 11, p 140-141, October, 1974. 3 fig.

Descriptors: *Pulp and paper industry, *Industrial water, *Treatment facilities, *Reclaimed water, *Water reuse, *Water conservation, Cost repayment, Economic justification, Suspended solids, Effluents, Recycling, Waste water(Pollution), Pulp wastes, Equipment, Filters, Filtration, Centrifugation.
Identifiers: Centrifuges, Fiber recovery, White water, Board mills.

Sweco Inc.'s new Centrifugal Wastewater Concentrator (CWC) removes fine particles and fiber from paper machine white water and from mill effluents. Hoerner Waldorf's (St. Paul, Minnesota) paperboard mill installed a CWC in order to reuse combined waste water from felt showers and vacuum seal water on one of its cylinder machines. The cost savings achieved by water recycling, energy conservation, and fiber reuse quickly paid back the initial investment for the unit. (Sykes-IPC)
W75-03900

IMPROVED CLARIFICATION OF BOOK MILL EFFLUENT,
Kimberly-Clark Corp., Neenah, Wis.
Y. C. Wu.

Industrial Water Engineering, Vol 11, No 2, p 22-26, March/April, 1974. 7 fig, 1 tab, 8 ref.

Descriptors: *Pulp wastes, *Enzymes, *Coagulation, *Waste water treatment, Water pollution treatment, Pulp and paper industry, Industrial wastes, Wastes, Waste treatment, *Wisconsin, Hydrogen ion concentration, Polymers, Water purification, Chemicals, Biochemical oxygen demand, Suspended solids, Optical properties, Operating costs, Costs.
Identifiers: *Clarifiers, Alum, Starch.

The feasibility of improving clarifier performance by an integrated enzyme-polymer coagulation system was investigated. Effluent from Kimberly-Clark Corp.'s (Kimberly, Wisconsin) printing paper mill was filtered to remove large suspended matter, and an enzyme (alpha-amylase, beta-amylase, Amzyme TX-8, or malt) was added. After 15 minutes of enzyme reaction, a predetermined amount of alum was added and the mixture, after settling, was analyzed for suspended solids, BOD, optical density, and starch concentration. Alpha- and beta-amylases reduce the dispersing power of starch. Overall performance of an integrated enzyme-polymer coagulation system was not affected by pH and enzyme working time factors, provided the pH of the effluent was between 4.5 and 6.5, and enzyme reaction time was at least 10-minutes. A 5-10% BOD removal reduction was caused primarily by the enzyme addition. For 10 million gallons/day of effluent, the annual savings in total treatment costs are estimated at $4,000 or more, using an integrating enzyme-polymer system (Amzyme TX-8 plus alum), compared to alum alone. (Sykes-IPC)
W75-03902

OZONE: A NEW METHOD TO REMOVE COLOR IN SECONDARY EFFLUENTS,
Welsbach Ozone Systems Corp., Philadelphia, Pa.
C. Nebel, R. D. Gottschling, and H. J. O'Neill.
Pulp and Paper, Vol 48, No 10, p 142-145, September, 1974. 4 fig, 7 tab, 10 ref.

Descriptors: *Ozone, *Pulp wastes, *Water treatment, *Waste water treatment, Oxidation, Color, Chemical oxygen demand, Biochemical oxygen demand, Dissolved oxygen, Water pollution sources, Industrial wastes, Pulp and paper industry, Effluents, Wastes, Laboratory tests, Capital costs, Operating costs, Costs, Economics.
Identifiers: Board mills, Kraft(Pulp) mills.

The high oxidation potential of ozone makes it attractive for treating pulp and paper mill effluents for reduction of color, COD, and BOD. After ozone treatment, effluents are completely saturated with dissolved oxygen, thereby eliminating post-aeration. Since sludge is not generated in ozonization, secondary clarifier and dewatering equipment are not required. The experimental ozonization of effluents from several kraft pulp and board mills is reported. Estimates of daily ozone requirements, capital investments, and treatment costs (ranging from $0.028 to $0.064/1000 gal) are given. (Hansen-IPC)
W75-03903

KNOWLTON (BROTHERS INC., WATERTOWN, NEW YORK) MILL CLOSES LOOP ON WASTE TREATMENT/WATER REUSE,
Malcolm Pirnie, Inc., White Plains, N.Y.
J. R. Folchetti.
Pulp and Paper, Vol 48, No 10, p 116-118, September, 1974. 3 fig, 2 tab.

Descriptors: *Pulp wastes, *Water conservation, *Treatment facilities, *Waste water treatment, *Reclaimed water, *Water reuse, Flocculation, Chemical precipitation, Water purification, Pulp and paper industry, Water quality, Water pollution control, Water pollution sources, Filters, Filtration, Closed conduits, Industrial water.
Identifiers: Photographic paper, Filter paper.

A paper mill which manufactures filter paper and black photographic paper is successfully operating a closed system which reclaims water from mill effluent and returns it to the mill as process water. The development of the system is reviewed. The waste water is pumped to a clarifier/flocculator where chemicals and slimicides are added. The flocculated and clarified waste then flows to a traveling belt filter for polishing and then enters the mill system as reclaimed process water. A flow diagram of the system and water quality data are given. (Hansen-IPC)
W75-03904

EFFECTIVENESS OF THE PRE-AERATOR (EFFEKTIVNOST' RABOTY PRE-AERATORA),
L. B. Pomerants.
Trudy Leningradskogo Tekhnologisheskogo Instituta Tsellyulozno-Bumazhnoi Promyshlennosti, No 30, p 137-143, 1973. 3 fig, 6 ref.

Descriptors: *Pulp wastes, *Aeration, *Treatment facilities, *Waste water treatment, *Efficiencies, Performance, Biological treatment, Nutrients, Water pollution sources, Waste treatment, Microorganisms, Biochemical oxygen demand, Chemical oxygen demand, On-site tests, Bacteria, Pseudomonas, Phosphorus compounds, Nitrogen compounds, Industrial wastes, Pulp and paper industry, Effluents, Carbohydrates.
Identifiers: Baikal pulp mill(USSR).

The second biological purification plant at the Baikal pulp mill receives two types of effluents, the so-called 'black stream' consisting of effluents from the digester room, evaporation plant, yeast plant, and the experimental plant; and the 'white stream' consisting mainly of effluents from the drying plant and the purification equipment of the bleaching plant. These two streams amount to 40,000 and 120,000 cu m/day, respectively. The operation of the new plant is unconventional in that the two streams are pooled and enriched with N and P salts. The residence time in the pre-aerator is up to 20 hr compared to the usual 3 hr. To determine the efficiency of this system, a microbiological study was made of the microflora in the preaerator (which develops spontaneously), and determination were made of the 5-day BOD and the COD. The data were collected during 334 days of plant operation and include seasonal variations in pollution load. The study showed an increase in the number of saprophytic bacteria in the preaerator from an initial 3,000 to 470,000 cells/ml (with the genus Pseudomonas predominating), obviously attributable to the presence of added nutrients. The reduction of BOD in the pre-aerator was 50%, compared to 15% in conventional pre-aerators. The COD was reduced about 30%. Compared to the aeration tank proper, the consumption of N in the pre-aerator at equal reduction of BOD was about 50% lower as a result of a C:N ratio more favorable to the synthesis of non-nitrogenous compounds, such as polysaccharides. (Stapinski-IPC)
W75-03905

CORRUGATED INK AND STARCH WASTES MEET EPA STANDARDS AT ST. REGIS.
Paperboard Packaging, Vol 59, No 12, p 24, 26, 28-29, December, 1974. 7 fig, 2 tab.

Descriptors: *Pulp wastes, *Treatment facilities, *Waste water treatment, Pollutants, *Chemical precipitation, Heavy metals, Water pollution control, Water reuse, Industrial wastes, Filtration, Separation techniques, Waste disposal, Landfills, Oil, Iron, Lead, Nickel, Zinc, Illinois, Water quality standards, Waste treatment, Effluents, Pigments, Color, Pollution abatement, Water pollution sources.
Identifiers: Corrugated boxes, Converting industry, Inks, Starch.

The waste water treatment system installed at the Bridgeview, Illinois, container plant of St. Regis Paper Co. is described. The batch system removes ink pigments, starch waste, oil contaminants, and heavy metals (Fe, Pb, Ni, and Zn) from the effluent. The pollutants are precipitated with chemicals, filtered from the water, and disposed of in a sanitary landfill. The treated water is decolorized in an activated carbon column and either reused in the container plant or discharged to the municipal waste treatment system. The treated effluent meets the State of Illinois criteria for discharge to municipal sewage plants. (Witt-IPC)
W75-03907

STATIC MIXING CONCEPT FOR AERATORS WINS ACCEPTANCE,
Kenics Corp., Danvers, Mass.
G. R. Fisette.
Pulp and Paper, Vol 48, No 10, p 70-72, September, 1974. 4 fig.

Descriptors: *Aeration, *Aerated lagoons, *Pulp wastes, Equipment, Oxygenation, Biochemical oxygen demand, *Waste water treatment, Pollution control, Pulp and paper industry, Water quality control, Waste waters(Pollution), Chemical oxygen demand, Treatment facilities.

A subsurface aeration system applicable to activated sludge and aerobic digestion processes is described. The mixing units are tubes of high-density polyethylene, 1 ft in diameter and 5 ft high, mounted vertically near the bottom of the aeration basin. Air is introduced at the bottom from a header, and helical deflectors inside the cylinders bring about intimate mixing of air and water. A zone of vertical liquid movement is established around each mixer in an array. Data on oxygen transfer rates at various air flow rates are given. In a one million gal basin with 184 aerators, uniform dispersion following the addition of a dye required only 20 minutes. Chemical oxygen demand reduction is over 96%. (Hansen-IPC)
W75-03914

STUDY OF THE SEASONAL EFFECTS ON THE MICROBIOLOGY OF A NORTHERN PULP AND PAPER MILL AERATION LAGOON,
Environmental Protection Service, Ottawa (Ontario).
A. S. Menon, and W. K. Bedford.
Canadian Department of the Environment, Environmental Protection Service Technology Development Report, No. 4-AR-73-1, 53 p, June, 1973. 8 fig, 15 tab, 12 ref, 1 append.

Descriptors: *Pulp wastes, *Aerated lagoons, *Microbiology, *Weather, *Coliforms, *Seasonal, Summer, Winter, Temperature, Nutrients, Treatment facilities, *Waste water treatment, Water pollution sources, Streptococcus, Microorganisms, Lagoons, Oxidation lagoons, Canada, Foreign countries, North America, Stabilization, Pulp and paper industry, Water purification, Biological treatment, Waste treatment, Biochemical oxygen demand, Bacteria, Aquatic bacteria.
Identifiers: Klebsiella, Ontario-Minnesota Pulp and Paper Co.

The second phase of a bacteriological study of Ontario-Minnesota Pulp and Paper Co.'s (Fort Frances, Ontario) waste treatment aeration lagoon assessed whether Klebsiellae and other coliform organisms proliferated in the lagoon and evaluated the seasonal effects on the microbial lagoon flora. The results indicated that the effluents from the separate kraft mill contained only a small number of pollution indicator organisms, but some of these organisms multiplied when entering the lagoon. Coliforms proliferated in the lagoon under both winter and summer conditions. Fecal coliforms and Klebsiellae required higher temperatures and complex nutrients for regrowth. They were capable of multiplying in the lagoon only under conditions prevailing during the summer, whereas fecal streptococci did not exhibit any regrowth under either conditions. Coliform reduction in the lagoon

was closely associated with the BOD removal, indicating that coliforms disappeared because some of the readily degradable carbohydrates had been removed, and also because of their inability to compete successfully with other microflora in the lagoon for nutrients. The influence of temperature on the microbial activities in the lagoon is evident from the data showing that larger numbers of various physiological groups were found in summer than in winter. The BOD removal increased from 49 to 65% in summer, indicating that higher temperatures accelerated the microbial process. The majority of the coliforms isolated from the kraft mill effluents and lagoon were Enterobacter strains. A small number of Klebsiellae were isolated. (Witt-IPC)
W75-03916

QUALITY WATER FOR HUMAN CONSUMPTION AND INDUSTRY,
Pettigrew Engineering Co. Pty. Ltd. (Australia).
A. Pettigrew.
Australian Chemical Engineering, Vol 15, No 10, p 17-20, October 1974.

Descriptors: *Waste water treatment, *Water treatment, *Water quality, Chlorination, Filtration, Fluoridation, Ion exchange, Water softening, Water purification, Industrial water, Filters, Equipment.
Identifiers: Deionizers.

Brief notes are provided on the various types of equipment which can be used or adapted for the treatment of water either for human consumption or for industrial purposes. Included are filters, clarification reactors, softeners, ion exchange resins and deionizers, chlorination and fluoridation. (Levick-CSIRO)
W75-03941

SOLVING EFFLUENT PROBLEMS BY THE USE OF CENTRIFUGES,
Alfa-Laval Pty. Ltd. (Australia). Industrial Div.
E. Skinner.
Australian Chemical Engineering Vol 15, No 10, p 21-25, October 1974. 15 fig.

Descriptors: *Centrifugation, Filtration, Effluents, *Separation techniques, Water purification, Water treatment, *Waste water treatment.
Identifiers: *Centrifuges.

The function of the centrifuge in separation processes is effectively to increase the acceleration of particles through the continuous phase, achieving separation in less time and using less space than under gravity alone. The available types of centrifuge are described in two major classes - filtering and sedimenting. Factors in the choice of machine for a particular application are presented and discussed. (Levick-CSIRO)
W75-03942

FILTRATION - MEDIA SELECTION IS THE KEY TO SUCCESS,
Barrier Filters Pty. Ltd. (Australia).
For primary bibliographic entry see Field 5F.
W75-03943

CRITERIA FOR REGIONALIZATION OF WATER AND WASTE MANAGEMENT SYSTEMS,
Pennsylvania State Univ., University Park. Dept. of Economics.
O. H. Sauerlender, B. V. Dall, J. G. Haltsman, J. D. Jansma, and S. M. Leadley.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 168, $4.25 in paper copy, $2.25 in microfiche. Pennsylvania Institute for Research on Land and Water Resources, University Park, Research Publication Number 84, June 1974. 70 p, 2 fig, 9 tab, 12 ref, append. OWRT B-035-PA(5), 14-31-0001-3327.

Descriptors: *Planning, *Administration, *Decision making, *Pennsylvania, Financial feasibility, Economies of scale, Alternative costs, *Regional analysis.
Identifiers: Regionalization, *Waste management systems, Community leadership, Waste water plans, Community size, Regional alternatives.

Based on this investigation, the following conclusions were reached: 1. Regionalization of water and waste management systems will not be easy to implement because of Pennsylvania's approach to water management. 2. Regionalization of water management systems is not universally good, but only attractive when economies of scale outweigh added distribution costs. 3. Substantial reductions in costs of wastewater management systems are attainable through regionalization, due primarily to the economies of size encountered in construction, operation, and maintenance of larger systems. 4. The local leadership in the study communities strongly objected to the most economically viable regionalization wastewater plans. The regionalization plans which are most economically attractive are generally not within the scope of what local leaders consider appropriate for their communities. Regionalization plans are somewhat attractive to small communities with no present wastewater system and least attractive to large communities which have some type of wastewater system. 5. More than 12,000 different alternatives exist for combining the municipalities in the study region. A decision-making procedure was developed for reducing the vast number of possible regional alternatives to a manageable number which could be ordered to reflect their priorities at the community level. (Sink-Penn State)
W75-03946

CUTBACK IN COSTRUCTION FUNDING STIRS DOUBT ON WATER QUALITY GOALS.
For primary bibliographic entry see Field 5G.
W75-03999

REGIONAL MANAGEMENT OF WASTE SYSTEMS,
Maryland Environmental Service, Annapolis.
T. D. McKewen.
Journal Water Pollution Control Federation, Vol 44, No 8, p 1493-1497, August 1972.

Descriptors: *Waste water pollution, *Regional analysis, *Water treatment, *State legislation, *Water pollution control, Liquid wastes, Solid wastes, Environmental sanitation, Water treatment, Water law, Water management(Applied), Enforcement, Maryland, Environmental protection, Water resources, Water policy, Water allocation(Policy), Administration, Administrative agencies, Environmental effects, Adoption of practices, Waste water treatment, Conservation, Pollution abatement.
Identifiers: Administrative regulations, State policy.

Many advances have been instituted to deal with the problem of waste management. Agencies such as the Maryland Environmental Service (MES) have been created to facilitate progress. The creation of the federal construction grant program has broken the pattern of exclusive state control of pollution regulation. MES can provide regional waste management where it is needed, financial capability for local areas, and equitable arrangements for waste management between jurisdictions whose respective interests may differ. Maryland's pollution control activities have increased in scope in recent years. By the end of the 1960's, the state government had become an active participant in planning, financing, and operator training in addition to retaining its traditional enforcement activities. It was noted, however, that the state must directly undertake the construction and operation of liquid and solid waste facilities. In 1970, the Maryland state legislature enacted the Environmental Service Act. The Service was directed to develop river basin plans for liquid waste management and regional plans for solid waste management. After the passage of the Act, new federal regulations were promulgated that require each state to have fully developed river basin plans by July 1, 1973. The Service is contributing to local projects pending creation of new regional projects. (Sperling-Florida)
W75-04000

DETECTION OF WATER POLLUTANTS BY A CO2 LASER,
Technische Universitaet, Munich (West Germany). Physikdepartment.
For primary bibliographic entry see Field 5A.
W75-04012

PROBLEM DEFINITION STUDY: EVALUATION OF HEALTH AND HYGIENE ASPECTS OF LAND DISPOSAL OF WASTEWATER AT MILITARY INSTALLATIONS,
Army Medical Environmental Engineering Research Unit, Edgewood Arsenal, Md.
C. A. Sorber, S. A. Schaub, and K. J. Guter.
Available from the National Technical Information Service, Springfield Va 22161 as AD-752 122, $3.75 in paper copy, $2.25 in microfiche. Report Number 73-02, August, 1972. 32 p, 72 ref, 5 append.

Descriptors: *Waste water disposal, *Aerosols, Pathogenic bacteria, Microorganisms, Pre-treatment, *Public health, *Waste water treatment, *Waste disposal, Application methods, Bioindicators.
Identifiers: Land disposal.

The most important variables in the health and hygiene aspects of waste water treatment by land disposal are: the ultimate use of the contaminated waste water; the method of application; and the degree of pre-treatment. These variables have physical, biological, and chemical effects. Waste treatment by land disposal was studied and the following conclusions were made: Many detrimental health and hygiene effects of land disposal would be reduced by proper waste water pretreatment. Biological contamination of groundwater could be avoided by choosing a disposal site with five to ten feet of continuous fine soil. There exists a significant probability of inhaling pathogenic aerosals near a spray irrigation site, Chemical components of sewage can increase the viability of bacteria, virus and protozoans in aerosols; Pathogenic microorganisms may survive longer in sewage aerosols and in soil than common indicator organisms. More mosquito breeding is an effect of ponding in disposal areas. If land disposal is the first step in a water recycle program, total dissolved solids, sodium and nitrate ion build-up in the groundwater can be problems. (Orr-FIRL)
W75-04015

SOLID WASTE AND WATER QUALITY, (LITERATURE REVIEW),
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
For primary bibliographic entry see Field 5B.
W75-04016

EPA'S POLLUTION CONTROL GOALS TAKE BROADSIDE IN SEATTLE.
For primary bibliographic entry see Field 5G.
W75-04023

CHARACTERIZATION AND DEWATERABILITY OF WATER TREATMENT PLANT RESIDUES,
Missouri Univ., Columbia. Dept. of Civil Engineering.
J. T. Novak.

Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 228, $4.25 in paper copy, $2.25 in microfiche. Missouri Water Resources Research Center, Columbia, Completion Report, October 1974. 64 p, 27 fig, 4 tab, 30 ref. OWRT A-061-MO(1). 14-31-0001-3825 and 4025.

Descriptors: *Waste water treatment, *Sludge treatment, Filtration, Settling, Centrifugarion, Sludge, *Dewatering, Drainage, Water treatment, Drying, Waste identification.
Identifiers: *Chemical sludge, Sand beds, *Air drying.

A variety of water treatment residues were characterized in order to determine the influence of specific chemical constituents, process flow schemes and raw water quality on the performance of sludge dewatering processes. The use of conventional sludge characterization parameters for process selection and design was evaluated by comparing process yields to sludge characteristics. The extent of dewatering was determined for four sludge dewatering methods and the physical properties of chemical sludges at varying solids levels compared to process performance to determine which of the processes produces a 'handleable' sludge. The draining and drying rates of chemical sludges applied to sand beds were related to several sludge characteristics. The time to drain was related to the sludge specific resistance, applied depth and solids concentration. Air drying occurred in two distinct phases. The initial or slow drying phase was governed by the sludge cake depth and drained solids concentration while the rapid drying rate was found to approximate the free surface water evaporation rate. Sludges with a coefficient of compressibility less than 0.7 were found to penetrate into the sand bed.
W75-04039

SOIL ADSORPTION OF HUMIC COLOR,
Nebraska Univ., Lincoln. Dept. of Civil Engineering.
R. A. Miller.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 229, $3.75 in paper copy, $2.25 in microfiche. M.S. Thesis, May 1974. 49 p, 10 fig, 5 tab, 22 ref, append. OWRT A-027-NEB(5).

Descriptors: *Color, Sands, Waste disposal, Biological treatment, *Feed lots, Runoff, Water quality, Soils, *Adsorption, *Chemical oxygen demand, Design criteria, *Waste water treatment, Farm wastes.
Identifiers: *Soil adsorption beds.

The degradation of receiving streams and lakes has prompted many studies on the treatment of feedlot runoff. Various biological treatment systems have been developed to reduce organic strength levels; however, economic color reduction has not been obtained. The main purpose of this study was to evaluate color reduction of feedlot runoff by the process of soil adsorption. Significant reductions in chemical oxygen demand were also anticipated. Conclusions are as follows: (1) color and COD removal from biologically treated feedlot runoff can be obtained by adsorption on clayey fine sand; (2) reduction of color and COD using soil beds is an effective, economical technique for disposal of biologically treated feedlot runoff; and (3) loading rates of 2 inches per day or less and depths of 5 feet or more should be used as design criteria for soil adsorption beds operating full.
W75-04043

ECONOMIC ANALYSIS OF LAND TREATMENT OF MUNICIPAL WASTEWATERS,
North Carolina State Univ., Raleigh. Dept. of Economics.
C. E. Young, and G. A. Carlson.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 186, $5.25 in paper copy, $2.25 in microfiche. North Carolina Water Resources Research Institute, Raleigh, UNC-WRRI Report No. 98, October 1974. 98 p, 8 fig, 14 tab, 43 ref, 3 append. OWRT A-072-NC(1). 14-31-0001-4033.

Descriptors: *Cost analysis, *Cost comparisons, Economics, Waste treatment, *Waste water treatment, Ultimate disposal, Sewage disposal, Land management, *Water reuse, *Municipal water, Regression analysis, Waste disposal, *Southeast US, Biochemical oxygen demand.
Identifiers: Wake County(NC), *Land spreading, Land treatment.

The 1972 Water Pollution Control Act Amendments require increased treatment of municipal wastewaters. One method to obtain a high quality effluent at relatively low cost compared to other techniques is land treatment. This study compares and evaluates conventional in-plant treatment and land treatment in a cost framework and in a production efficiency framework. The major objective is to explain why more municipalities have not chosen land treatment in the past. Regression analysis was used to estimate cost functions for 125 municipal treatment plants across the southern portion of the United States. Comparison of the two types indicates that inclusion of land treatment permits higher levels of treatment per dollar of expenditure. The advantages of land treatment are greater for small plants. A .5 million gallons per day (mgd) plant will save $.07 per 1000 gallons treated to 85 percent removal of five-day biochemical oxygen demand (BOD5) if it uses land treatment, while a 10 mgd plant will save $.05 per 1000 gallons. Cost differentials are greater for treatment to 95 percent BOD5 removal. Savings could be increased by 7-15 cents more from sale of by-products from the land site depending upon site characteristics and product prices. The probability of adopting land treatment increases as maximum final BOD5 requirements are lowered, irrigation prices rise, and as stream flow and rainfall become smaller. Land purchase prices were not significant in explaining adoption of land spreading of wastes since only about 40 percent of the land treatment sites purchased land for the purpose of spreading effluent and sludge. The remainder used other public lands or sold or gave the wastes to farmers. (McJunkin-N.C. State)
W75-04047

PHOSPHORUS DETERGENT BAN-HOW EFFECTIVE,
Pieczonka Consultants, Lackawanna, N.Y.
P. Pieczonka, and N. E. Hopson.
Water and Sewage Works, Vol 121, No 7, p 52-55, July, 1974. 1 tab, 10 ref.

Descriptors: *Phosphorus, *Detergents, *Water pollution, *Sewage treatment, Domestic sewage, Effluent control, Eutrophication, Lakes, *New York, *Waste water treatment, Costs.
Identifiers: *Stannous fluoride treatment, Erie County(NY).

The eutrophication rate of a lake is greatly increased by the addition of more nutrient, such as phosphorus. A study in Erie County, New York, attempted to answer basic questions in phosphorus detergent pollution from domestic sewage. The primary questions explored were what percentage of phosphorus reduction could be expected in the influent of a sewage treatment plant treating domestic wastes, and what effect would an effective ban of phosphate detergents have on sewage treatment costs. In domestic sewage, the average phosphorus content is about 10 mg/liter. The rate limiting concentration of phosphorus is about 0.01 mg/liter. It was determined that the enactment of a ban on the detergents would not solve the problem of eutrophication. Phosphorus removal in waste water treatment plants was required. The Lackawanna Sewage Treatment Plant was investigated for further solutions. Composite grab samples were studied for total phosphorus in accordance with the Standard Methods for the Examination of Water and Wastewater. A stannous chloride technique and total phosphate determination were utilized for all phosphorus analyses. It was concluded that phosphorus detergent bans reduced phosphorus loading at a domestic sewage plant by 55.7 percent, although the banning is insufficient for fighting this pollution problem alone. (Leibowitz-FIRL)
W75-04109

OPERATIONAL ASPECTS OF URBAN SEWAGE WORKS,
Leyland Urban District Council (England).
J. Hatfield, K. Ormerod, and C. South.
Water Pollution Control, Vol 73, No 4, p 369-381, 1974. 1 fig, 2 tab.

Descriptors: *Sewage treatment, *Sewerage, *Management, *Design, Sewage districts, Sludge treatment, Sludge disposal, *Waste water treatment, Treatment, *Operations.

Sewage treatment and sewerage works of three relatively small local authorities in Great Britain and their problems of management are discussed. Included are details concerning the division of works within the three authorities, a description of the treatment units at the works, and the management of the labor force employed. It was concluded that where competent management staff are available on sewage works, they should be included in consultations with the persons responsible for the design of treatment plants. More stress needs to be placed on determining the ecologically best method of sludge disposal and on providing the most appropriate treatment method. The small works described can produce results comparable with the results of much larger units when reasonably designed and well run. Smaller works also maintain much of the team spirit and pride of achievement which often cannot be found on larger works. (Orr-FIRL)
W75-04114

PHILADELPHIA PILOTS--BUILDS OXYGEN ACTIVATED SLUDGE,
Philadelphia Water Dept., Pa.
C. F. Guarino, M. D. Nelson, and A. B. Edwards.
Journal of the Environmental Engineering Division, Vol 100, No EE4, p 919-935, August, 1974. 14 fig, 7 tab.

Descriptors: *Activated sludge, Oxygen, *Municipal wastes, *Waste water treatment, Pilot plants, *Pennsylvania, Treatment facilities, *Cost comparisons.
Identifiers: *Oxygen activated sludge, *Philadelphia(Penn).

Philadelphia, Pennsylvania, is expanding all three of its large water pollution control plants. The city has been running oxygen activated sludge pilot plants since March, 1971. UNOX pilot units were operated at each plant. Comparative cost studies between air activated and oxygen activated systems were made. The construction costs and annual costs for the oxygen system were estimated to be $11,060,000 and $1,418,000, respectively. The air system would have construction costs of $13,165,000 and annual costs of $1,506,000. Extensive pilot work indicates that the activated sludge process using pure oxygen is a feasible unit process for treating waste water. During the pilot study, high levels of treatment were consistently achieved even when the organic loading and oxygenation time varied widely. The total cost of a system using pure oxygen is less than that for one using air even though using air has a lower annual cost in the aeration part of the system. The city of Philadelphia has decided to build activated sludge facilities using pure oxygen at two of its plants. The facilities will have capacities of 150 mgd and 210 mgd. (Orr-FIRL)

W75-04115

MICROBIOLOGY OF WASTE TREATMENT, (LITERATURE REVIEW),
Pennsylvania State Univ., University Park.
R. F. Unz.
Journal Water Pollution Control Federation, Vol 46, No 6, p 1372-1383, June, 1974. 115 refs.

Descriptors: *Reviews, *Waste water treatment, Microorganisms, Activated sludge, Bacteria, Waste treatment, *Bibliographies, *Microbiology, Viruses, Yeasts, Protozoa, Inhibition, Flocculation, Biodegradation, Nutrients, Temperature.

This literature review covers various aspects of waste water disinfection. Topics covered include: microorganisms of sanitary significance, viruses, yeasts and protozoa, microbial inhibition, filamentous microorganisms, bioflocculation and biopolymers, biodegradation, activated sludge dynamics, temperature effects, and nutrients. (Orr-FIRL)
W75-04117

MIXING IN ANAEROBIC DIGESTION,
Notre Dame Univ., Ind. Dept. of Chemical Engineering.
F. H. Verhoff, M. W. Tenney, and W. F. Echelberger.
Biotechnology and Bioengineering, Vol. 16, No 6, p 757-770, June, 1974. 6 fig, 4 ref.

Descriptors: *Anaerobic digestion, *Mixing, Thermal properties, Hydraulics, *Waste water treatment, Flow, *Indiana.
Identifiers: Hydraulic dead zones, Reaction kinetics, Fluid inflow and outflow, Thermal fluid movement.

Hydraulic dead zones are hazardous to the reaction kinetics involved in anaerobic digestion. An analysis of the significance of thermal fluid movement in the digester to those caused by fluid inflow and outflow is discussed. The principles are exemplified in a digester at the South Bend Wastewater Treatment Plant, South Bend, Indiana. The theoretical estimations are confirmed by experimental measurements. Different types of optimization can be achieved on this operation. One example is the application of this mixing to gas lift mixers. (Leibowitz-FIRL)
W75-04120

WASTEWATER TREATMENT, PHYSICAL AND CHEMICAL METHODS, (LITERATURE REVIEW),
Massachusetts Univ., Amherst. Dept. of Civil Engineering.
F. A. DiGiane, and A. B. Scaramelli.
Journal Water Pollution Control Federation, Vol 46, No 6, p 1109-1121, June, 1974. 1 tab, 131 ref.

Descriptors: *Reviews, *Waste water treatment, *Phosphorus, Water pollution, *Coagulation, *Adsorption, *Nutrients, Polymers, *Filtration, Ion exchange, Reverse osmosis, Disinfection, Biochemical oxygen demand, Ammonia, Solids separation, Nitrogen, Membrane processes, Ozone, Pulp wastes, *Bibliographies.
Identifiers: Physical-chemical treatment systems, Nonionic polyacrylamide polymer, Microstrainers, Sand filters, Ultra-high-rate filtration, Clarification.

Physical-chemical techniques for removing nutrients, biodegradable and nonbiodegradable organics and colloidal suspensions were reviewed. A new physical-chemical plant at Rosemount, Minnesota, consists of pretreatment, clarification, filtration, adsorption, ion exchange, and disinfection; it has a capacity to reduce BOD from 200 mg/liter to 10 mg/liter, and ammonia and phosphorus to one mg/liter. Treatments by coagulation, filtration, adsorption, ion exchange, reverse osmosis, flocculation, sedimentation, foam separation, and carbon adsorption techniques were explored. In one instance, a mobile 18-process, trailer mounted pilot plant was employed to evaluate physical-chemical treatment for effluent quality. U.S. installations where the removal of phosphorus has been achieved and European phosphorus removal by coagulation were compared. Domestic and paper mill waste treatment utilizing the low lime process was examined in both bench and pilot plant studies. Eighty-five percent removal of suspended solids, complete phosphorus removal and 60 percent removal of COD was accomplished by the addition of lime to pH 10.0 and the recarbonation to pH 8.5. Laboratory tests dealing with the removal of phosphorus from laundry wastes indicated that calcium chloride was the most effective precipitant, with optimum removal occurring at pH 10.0. (Leibowitz-FIRL)
W75-04121

FILTRATION ENGINEERING'S SYMPOSIUM ON MEMBRANE SEPARATION.
Filtration Engineering, Vol 5, No 5, p 7-8, 10-12, 14-18, 23-24, 26, 28, July/August, 1974. 7 fig, 1 tab.

Descriptors: *Membrane processes, *Filtration, *Separation techniques, Reverse osmosis, Organic matter, Oil wastes, Colloids, Centrifugation, *Waste water treatment.
Identifiers: *Membrane separation, *Ultrafiltration, Hydrocyclones, Oil emulsions.

Ultrafiltration is defined as a solvent and a solute placed in a pressure side of a membrane. A permeate flows through the membrane with a concentrated solute remaining on the same side of the membrane. The solute may be solids, colloids or various organic molecules. Pore structure and the material of the membrane influence significantly the efficiency of the separation. This is a low-energy separation process, and is an alternative to spray drying, evaporation, selective precipitation and other fine medial filtration processes. Applications of ultrafiltration cover a large range of particle sizes, ranging from ten microns on the high side to ten angstroms on the low side. On the low side the membranes are similar to reverse osmosis membranes. Ultrafiltration's basic characteristic, however, is that the osmotic pressure is extremely low in solution and operating pressures are about 50 psi, whereas reverse osmosis is closer to 500 to 1,000 psi. The flux per unit area is the same or higher than the reverse osmosis separation. Ultrafiltration is less costly than chemical treatment for the treatment of oil emulsions. It involves no chemical usage, therefore adding no pollution to the system. In the General Electric system discussed, a 2.0 percent emulsion is concentrated up to about 50 percent, at the point of combustibility. Because the membrane is only a physical barrier to the passage of oil droplets, the changes in waste characteristics have no effect on the ultrafiltration system's performance. (Leibowitz-FIRL)
W75-04122

AN OVERLOADED SLUDGE PLANT. TRY CHEMICAL TREATMENT,
Hercules Inc., Wilmington, Del.
S. C. Pearson, and R. G. Soltis.
Water and Sewage Works, Vol 121, No 7, p 56-58, July, 1974. 2 fig, 8 ref.

Descriptors: *Sludge removal, *Chemical treatment, *Flocculation, *Waste water treatment, Separation techniques, Solid wastes, Mixed liquor, Digestion, Biochemical oxygen demand.
Identifiers: *Solids transport capacity, Inorganic coagulant, Hydraulic overload, *Clarification.

The solids transport capacity is the sum of two parts, one of which, the capacity due to sludge withdrawal, is alterable by the plant operation. An increase of solids loading on the clarifier from 12 to 16 lb/sq ft/day necessitates that the sludge recycle be increased from 50 to 65 percent to prevent solids carryover. A limited activated sludge recycle capacity can influence the chemical treatment objectives to a large extent. These objectives include the reduction of solids loading on the final clarifiers and maintenance of good solids capture across the final clarifiers in the face of flow increase; both objectives depend upon the accomplishment of maximum BOD removal in the primary basin by adding an inorganic coagulant and flocculant to the raw sewage and by adding a flocculant to the mixed liquor to ensure complete clarification. A flocculant is added to the sludge thickener for the prevention of a hydraulic overload on the digesters. The experiment had three different phases, including the establishment of a baseline by operating the plant at overload with no chemical treatment; the evaluation of the potential flocculation of mixed liquor as the only form of treatment; and full chemical treatment in primary and secondary systems. (Leibowitz-FIRL)
W75-04123

HOW CHICAGO MANAGES ITS DISTRIBUTION SYSTEM,
Chicago Dept. of Water and Sewers, Ill.
For primary bibliographic entry see Field 6C.
W75-04197

PLANNED REUSE OF POLLUTED WATERS AND WASTEWATERS,
North Carolina Univ., Chapel Hill.
D. A. Okun.
Effluent and Water Treatment Journal, Vol 14, No 7, p 373-376, July, 1974. 11 ref.

Descriptors: *Water reuse, *Waste water treatment, *Water pollution, *Water management, *Potable water, *Water treatment, Water demand, Water quality, Water pollution effects, Water supply, Quality control, Waste water, Water utilization, Water costs, Water delivery, Water pollution control, Water sources, Waste dilution, Industrial wastes, Municipal wastes, Treatment, Water resources development, Water policy, Water conservation, Conservation.
Identifiers: *Pollution, *Dual supply system, Water Act 1973(England and Wales), Regional water authorities, Regionalization.

While growing population and urbanization is exerting pressure on limited water sources, direct reuse of waste water for drinking may be dangerous. Natural benefits afforded by transit time between points of discharge and recovery, dilution by fresh water, and disinfection by sunlight, sedimentation, and natural biochemical degradation in natural water courses are not present when direct reuse is practiced. Direct reuse poses other problem, including removal of urban chemical contaminants, below-standard facility operation, unavailable technology for analysis and monitoring potable water, lack of fail-safe technology for treatment, and the public's reluctance to ingest its own wastes. One approach to meet water demand is the dual supply system, in which reclaimed waste water is used for non-potable purposes. Benefits of this system include relieving pressure on high-quality water sources, stream pollution reduction, lower costs than for developing new sources, and lower risk of ingesting contaminants. Using polluted waters and waste water for non-potable purposes seems to be the recourse for the future. In addition, water resources and water pollution control authorities must cooperate on a regional basis to plan safe and efficient water reuse. (Grden-North Carolina)
W75-04198

A WATER SEWER PLAN AND PROGRAM FOR THE YOUNGSTOWN-WARREN METROPOLITAN AREA,
Mahoning-Trumbull Council of Governments, Ohio.

September 24, 1970. 27 p, 6 fig, 1 tab, 6 maps, 2 append. HUD P-273, Ohio P-273(G).

Descriptors: *Water distribution(Applied), *Water management(Applied), *Waste water treatment, *Urban hydrology, *Sewers, *Water resources development, *Water management, *Waste water disposal, Sewerage, Ohio, Water supply, Planning, Waste water(Pollution), Sewage districts.
Identifiers: Youngstown(Ohio), Warren(Ohio), Mahoning County(Ohio), Trumbull(Ohio), Mahoning River Management Committee, Northeast Ohio Water Development Plan.

The current state of water sewer development in the Youngstown-Warren Standard Metropolitan Area preliminary to developing a regional water resources management system is described in an initial attempt to draw together hitherto fragmented efforts. The Water Sewer Plan is closely related to and coordinated with Mahoning-Trumbull COG's land use plan and housing plan in recognition of the interrelationship between these factors. Various governmental units have responsibility for water and sewer planning and facilities development. Final responsibility for action remains with individual subdivisions. Coordination for planning has come from the Mahoning-Trumbull Counties Comprehensive Transportation and Development Study which produced the first collection of water and sewer data on a regional basis and the State of Ohio Department of Natural Resources which has been preparing the Northeast Ohio Water Development Plan. An informed group of public and industrial leaders, the Mahoning River Management Committee, has begun development of 'cooperative programs in water resources management between local government and private industry.' Plan objectives include (1) pollution reduction, (2) adequate water and sewer facilities for realistic housing goals, (3) maintenance and/or improvement of existing facilities, and (4) an efficient management system with political responsiveness. The plan also incorporates a provision for citizen participation. Listings, profiles, costs, completion dates and short descriptions of some seventy water sewer projects underway, scheduled or proposed for the area, are provided. (Salzman-North Carolina)
W75-04200

SOME CHARACTERISTICS OF COUNTERJET FLOW,
Sir George Williams Univ., Montreal (Quebec).
For primary bibliographic entry see Field 5B.
W75-04217

DRY-TYPE COOLING SYSTEMS IN ELECTRIC POWER PRODUCTION,
North Dakota State Univ., Fargo. Dept. of Mechanical Engineering.
K. W. Li.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 109-119. 7 ref.

Descriptors: *Cooling towers, *Water cooling, *Thermal powerplants, Equipment, Heated water, Heat transfer, Environment, *Waste water treatment.
Identifiers: *Dry-type cooling tower.

A dry-type cooling tower (essentially a radiator) could be adopted as an alternative for removing waste heat from power plants. The principal drawbacks to using dry cooling towers were contrasted to several advantages, most significantly, the elimination of thermal discharge to natural water bodies. (See also W75-04213) (Jess-ISWS)
W75-04221

COOLING TOWERS - BEST ACHIEVABLE THERMAL POLLUTION ABATEMENT TECHNOLOGY,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
F. L. Parker, and E. B. Jernigan.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 133-141. 1 tab, 16 ref.

Descriptors: *Economics, *Powerplants, *Thermal pollution, *Cooling towers, Ecology, Environmental effects, Benefits, Costs, Nuclear powerplants, *Alabama, Water pollution, Decision making, Air pollution, Aquatic habitats, *Thermal pollution, Cost-benefit analysis.
Identifiers: Case study.

The use of benefit-cost analyses to aid in decision making is an established practice in water resources engineering. The benefits and costs of recommended technology were evaluated for a case study of Browns Ferry Nuclear Power Plant, Alabama. Economically, the estimated costs exceeded the estimated benefits by about $30,000,000. In impact upon the environment, the cooling towers were more harmful than once-through cooling. There is not enough information available to make definitive statements on the biological damages that would be caused by raising the temperatures of the reservoir approximately 10F instead of 5F. However, all available evidence tends to support the conclusion that the upset of the aquatic flora and fauna would not be devastating in any respect, that it would occur only in a relatively small area in the immediate vicinity of the plant, and that it would not involve any significant, valuable, or endangered species. If significant, unforeseen problems should develop, an off-stream cooling system could then be instituted and the reservoir would return to its original condition. Failure to apply an extensive benefit-cost analysis to the alternatives for controlling thermal releases from the Nuclear Plant clearly resulted in an incorrect and very expensive decision. Each environmental case must be considered and analyzed in its own right. (See also W75-04213) (Humphreys-ISWS)
W75-04223

A DEMONSTRATION OF WASTE HEAT USE IN AGRICULTURE,
National Environmental Research Center, Corvallis, Oreg.
A. G. Christianson, J. W. Berry, and H. H. Miller, Jr.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 142-153. 4 fig, 2 tab.

Descriptors: Agriculture, *Experimental farms, *Heated water, *On-site investigations, Irrigation, Instrumentation, Soil temperature, Field crops, Fruit crops, Nuts, Greenhouses, Frost protection, Thermal powerplants, Cooling water, Heating, Soils, *Water reuse, *Thermal pollution.

Highlights were described of a demonstration project, concluded May 31, 1973, that used warmed condenser cooling water for agricultural purposes. The project demonstrated specific methods of using the warmed water. For some applications, i.e., irrigation and plant cooling, such water does not offer significant benefits that can be attributed to its elevated temperature alone; conversely, no damage need be incurred. For frost protection, warm water offers advantages over water at normal temperatures. Warm water use for underground soil heating, in open fields and under greenhouses, shows significant potential for profitable use for selected crops which demonstrated increased yields. (See also W75-04213) (Humphreys-ISWS)
W75-04224

A COMBINED SYSTEM CONCEPT FOR POWER GENERATION AND WASTEWATER RENOVATION,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
R. A. Fazzolare, and R. A. Sierka.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 180-185. 1 fig, 1 tab, 3 ref. OWRT A-044-ARIZ(1).

Descriptors: *Waste water treatment, *Water reuse, *Cooling water, *Heated water, Thermal power, Heat exchangers, Thermal pollution, Heat transfers, Cooling towers, Condensers, Powerplants, Solid wastes, Heat transfer.

Laboratory investigations of a one-step physical-chemical waste treatment process carried out at elevated temperatures indicated performance at least equivalent to conventional secondary sewage treatment. Significantly improved floc and sludge characteristics suggested desirable design parameters for commercial application. Based on these results, a combined power plant-wastewater treatment plant was proposed as a viable engineering concept. Use of waste heat in the wastewater treatment plant was predicted to result in the generation of water for condenser cooling as well as production of additional reusable water. Final handling of the quantities of sewage sludge generated is being investigated. Possible alternatives include use as a fertilizer or for conditioning of arid soils. (See also W75-04213) (Harmeson-ISWS)
W75-04227

DESIGN OF THERMAL COOLING SYSTEMS USING THE CASCADE OF ENERGY CONCEPT,
Oklahoma Univ., Norman. Dept. of Aerospace, Mechanical and Nuclear Engineering.
D. G. Harden.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 186-193. 3 ref.

Descriptors: Energy, *Energy budget, *Energy transfer, *Thermal pollution, Cooling, Thermodynamics, Entropy, Nuclear energy, Wastes, Irrigation, Irrigation water, Heat transfer, Nuclear powerplants, *Waste treatment.
Identifiers: *Energy cascade systems, *Thermal cooling systems, Conversion process, Steam powerplants.

The progress of mankind is related to his increased understanding of energy and its uses. Energy which exists in mass at potentials above the lowest corresponding potential in the surroundings is considered by man to be available or free, for he has found that with suitable devices he can obtain useful effects greater than his cost by removing the constraints on the energy and allowing it to pass through his device on its way to equalizing with the corresponding lower potential. The proposed cascade system of energy usage recognize that energy needs occur at different potential levels and attempted to maximize the useful effects for man of energy flows. An energy cascade system can be designed most logically by starting with those uses which have outlet conditions at or near the lowest naturally accessible potentials. Then

appropriate energy utilization devices can be inserted which utilize no more of the existing potential than necessary. The cascade method is the reverse of the normal design method. Several illustrations of the cascade type of design were discussed. (See also W75-04213) (Bhowmik-ISWS)
W75-04228

PREDICTION OF OXYGEN TRANSFER RATE IN AIR BUBBLE AERATION,
Institutul de Studii si Cercetari Hidrotehnice, Bucharest (Rumania).
A. G. Munteanu, and F. Briere.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 514-523. 9 fig.

Descriptors: *Aeration, *Air entrainment, *Bubbles, *Turbulence, *Oxygenation, Oxygen, Dissolved oxygen, Water quality, Water analysis, Turbulent flow, Oxygen requirements, Mechanical properties, Mixing, Analytical techniques, Mathematical studies, Instrumentation, *Waste water treatment, Diffusion.
Identifiers: *Oxygen transfers.

Water aeration experiments were conducted to establish, according to classical methodology, the variation of the overall oxygen transport coefficient from air to water in response to: (1) aeration intensity, (2) water height above the aerator, and (3) the aerator orifice diameter. The results of the experiments show that aeration intensity is the main factor controlling the rate of oxygen transport. The important part played by turbulence in the transport process was clearly demonstrated by the increase in specific transport rate per unit contact area caused by increasing aeration intensity. A description of the aerator apparatus used in the experiments was included. (See also W75-04213) (Henley-ISWS)
W75-04253

HYDROGEN PEROXIDE TREATMENT OF EFFLUENT RESULTING FROM WET AIR OXIDATION OF SHIPBOARD WASTES,
Naval Academy, Annapolis, Md. Dept. of Chemistry.
E. Koubek.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-777 096, $3.25 in paper copy, $2.25 in microfiche. Report No. USNA-EPRD-3, February 1974. 10 p, 3 tab, 10 ref.

Descriptors: *Waste water treatment, *Sewage treatment, *Sewage effluents, *Oxidation, Chemical oxygen demand, Chemicals.
Identifiers: Shipboard wastes, *Wet air oxidation, Hydrogen peroxide.

It was proposed that hydrogen peroxide could be used to oxidize or reduce the residual chemical oxygen demand of shipboard waste effluents that have been subjected to wet air oxidation treatment. Studies were made of the effects of various catalysts on the oxidation of acetic acid by hydrogen peroxide, and of acetic acid-peroxide reactions which were irradiated with ultraviolet light. An advantage was claimed for the use of hydrogen peroxide because it adds no new pollutants to the effluents that it treats. (Harmeson-ISWS)
W75-04261

INDUSTRIAL WASTEWATERS, RED RIVER ARMY DEPOT, TEXARKANA, TEXAS,
Army Construction Engineering Research Lab., Champaign, Ill.
J. E. Matherly, R. J. Fileccia, and H. A. Porte.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-778 162, $4.75 in paper copy, $2.25 in microfiche. Technical Report E-24, April 1974. 77 p, 5 fig, 3 tab, 16 ref, 3 append.

Descriptors: *Industrial wastes, Water pollution sources, *Waste treatment, Waste water(Pollution), Water conservation, *Waste water treatment, On-site investigations, Laboratory tests, Costs, *Texas.
Identifiers: Red River Army Depot(Tex).

The volume and character of industrial wastewaters discharged from the motorized vehicle maintenance area of the Red River Army Depot were described. Field and laboratory studies and measurements were made with regard to the character and treatment of wastewater. Design criteria were generated for an industrial wastewater treatment facility that would enable oil and grease removal, phosphate removal, and pH adjustment. This treatment would precede biological treatment in an existing secondary treatment facility at the neighboring Lone Star Army Ammunition Plant. The need for a new gravity wastewater collection system was identified and consideration was given to its congifuration. Existing industria wastewaters were classified according to treatment requirements and methods of collection. Cost estimates for proposed additions and changes to facilities were presented. (Harmeson-ISWS)
W75-04263

QUALITY CONTROL IN RIVER MANAGEMENT OF THE BRISTOL AVON,
Bristol Avon River Authority (England).
For primary bibliographic entry see Field 5G.
W75-04324

INTERFACING NEWLY DEVELOPED TECHNOLOGY WITHIN PRESENT WASTEWATER TREATMENT TRAINS,
Hebrew Univ., Jerusalem (Israel). Graduate School of Applied Science and Technology.
G. Belfort.
Journal of the American Water Works Association, Vol 66, No 8, p 504-505, August, 1974. 1 tab, 6 ref.

Descriptors: *Waste water treatment, *Membrane processes, *Water pollution, *Reverse osmosis, Pilot plants, Municipal wastes, Effluents, Economics, Biological treatment, Filtration.
Identifiers: *Pressure-driven membrane processes, Inorganic ions, Conservative constituents.

Much research and pilot plant experimentation is underway to investigate the usefulness of membrane processes for waste water treatment in the pulp and paper, mining, photographic, paint, food and pharmaceutical, textile and electronic industries. Formerly the concern has been with the evaluation of membrane performance or permeator design with different municipal effluents, and the longevity of the system. Advanced processes, being more complicated, cost more to operate, but the rate of treatment is high and land utilization is low. For conventional processes less external energy is required. Traditional biological treatment processes have lower operating and maintenance costs but higher capital investment than the advanced processes including the pressure-driven membrane processes. However, the buildup of constituents resulting from multiple recycling, will have to be considered. Dissolved inorganic ions, refractory organics, and viruses are among the conservative constituents for normal biological secondary treatment. Reverse osmosis is one of the only processes that can totally remove such conservative constituents from the effluent stream. There exist many differences in structure and operation between a specific group of advanced processes (pressure-driven membrane) and the traditional processes for waste water treatment. Research and planning can minimize or avoid potential problems associated with the integration of diverse methods. (Leibowitz-FIRL)
W75-04325

TREATMENT OF CRUDE SEWAGE IN TWO HIGH-RATE ACTIVATED-SLUDGE PLANTS OPERATED IN SERIES,
Water Pollution Research Lab., Stevenage (England).
A. G. Boon, and D. R. Burgess.
Water Pollution Control, Vol 73, No 4, p 382-395, 1974. 4 fig, 4 tab, 11 ref.

Descriptors: *Water pollution, *Effluents, *Sewage treatment, *Activated sludge, Biochemical oxygen demand, Nitrification, Sewage bacteria, Sedimentation, Aeration, *Waste water treatment.
Identifiers: *Settled domestic sewage, *Nitrosomona.

Experiments have determined that during the treatment of settled domestic sewage from Stevenage, England at a temperature of 17 degrees C the growth rate constant ranged from 0.15 to 0.59 d to the minus first power apparently as a result of different degrees of inhibition to the nitrifying bacteria under various conditions of treatment. Recently it has been shown that when treating similar sewage, nitrification is achieved consistently when the wastage rate of the activated-sludge is 0.36 d to the minus first power corresponding to a sludge age of 2.78 d, when the temperature is in the range of 16 to 21 degrees C. The implication is that the growth rate is constant for Nitrosomonas at more than 0.36 d to the minus first power. The average BOD of effluent has been attainable consistently at 50 mg/liter, maintaining at the same time a high-rate of treatment with the activated sludge settling in the final sedimentation stage. Results confirmed that when treating settled sewage in the same plant, the high quality of effluent can be achieved with short periods of aeration of sewage at high sludge loadings, as long as the rate of treatment is not limited by the concentration of dissolved oxygen in the mixed liquor. (Leibowitz-FIRL)
W75-04334

CONTAINING THE FLOW OF SEWAGE SLUDGE.
Environmental Science and Technology, Vol 8, No 8, p 702-703, August, 1974. 1 fig, 1 tab.

Descriptors: *Sewage sludge disposal, *Digestion, Water pollution, Heavy metals, Pesticides, Pathogenic bacteria, Landfills, *Sewage treatment, Florida, Pennsylvania, Fertilizer, Agriculture, Dewatering, *Incineration, *Waste water treatment.
Identifiers: *Sludge incineration, Philadelphia(Penn), Pensacola(Fla).

The Philadelphia Water Department has conducted a simple 'unit' operation for the containment of sewage sludge. The sludge is anaerobically digested and pumped to a lagoon for thickening to about 12.5 percent solids. This thickened sludge is transferred to a 2 million gallon holding barge which is towed out to sea. The discharge of the sludge occurs over a 6 mile course at approximately 30,000 gpm. No lasting harmful effects were determined by a joint study on this process. Because of an increase in ocean and outfall sludge dumping, ocean disposal regulations and restrictions have increased to such an extent that land disposal is expected to increase. Landfilling sites, however, are scarce and expensive, precipitating the old technique of land use of sludge for agricultural needs like soil conditioning and fertilizing supplementation. For example, sludge disposal takes care of 80,000 gpd near Pensacola, Florida. The optimum rate of sludge application for corn, sorghum and soy growth was estimated at 1 inch per week. Cattle fed these grains for 6 months are

to be tested for heavy metal and other toxic substances in the animal' tissues. The U.S. Department of Agriculture is investigating composting and trenching of sludge. Estimates are that primary sludge provide only 1 percent of nitrogen usable for agriculture. Allegheny County Sanitary Authority introduced vacuum filters for dewatering sludge, utilizing the maximum heat, so as to generate steam as a final product by burning a mixture of sewage solids and solid waste materials. (Leibowitz-FIRL)
W75-04336

REBIRTH OF THE SEWAGE FARM.
The Consulting Engineer, Vol 38, No 7, p 49-51, July, 1974. 2 fig.

Descriptors: *Digested sludge, Settling tanks, High-rated heated digestion, Chicago(Ill).

The Metropolitan Sanitary District of Chicago has developed a land reclamation program. Digested sludge is taken by a barge down the Illinois River to Fulton County, 200 miles from Chicago. From this location it is pumped eleven miles underground to reservoirs, then it is sprayed by sprinklers over a portion of 11,000 acres purchased by the MSD. More than 1500 M gallons of sewage is treated each day. The treatment removes 90 percent of the solids in settling tanks, and high-rate heated digestion treats the solids and accompanying liquids. The Chicago district produces approximately 1,000 dry tons of digested sludge. A new scheme of expansion includes the construction of deep tunnels and underground reservoirs for storing storm sewage awaiting treatment. The Muskegon County Wastewater Management System of Michigan is pumping sewage from ten towns through a rising main to a treatment plant north-west of Muskegon. BOD is reduced 70-90 percent by conventional primary and secondary treatment. Vast lagoons store the effluent where solids settle out. The lagoons will be dredged in five years. From the lagoons the effluent flows to an irrigation system where it is disinfected with chlorine. (Leibowitz-FIRL)
W75-04337

APPLICATION OF MICRO-CONTROLLERS MELMIC 100 TO WATER TREATMENT FACILITIES, (IN JAPANESE),
Mitsubishi Heavy-Industries Ltd., Tokyo (Japan).
Z. Moriguchi.
Mitsubishi Denki Giho, Vol 48, No 6, p 750-765, June 1974. 11 fig, 3 ref.

Descriptors: *Waste water treatment, *Water supply, *Sewage treatment, Water quality control, Treatment facilities, *Control systems, Water treatment.
Identifiers: *Micro-Controllers MELMIC 100.

City water service and sewage treatment facilities are becoming larger and more complicated with the upgrading of public welfare and municipal development. Electric equipment makes it necessary to emphasize the reliability and ease of operations. Micro-controllers MELMIC 100 has been developed and manufactured as a static sequence controller with arithmetic counting apparatus. This process promotes the serviceability of the facility. Examples of application are presented for consideration of water treatment systems. (Leibowitz-FIRL)
W75-04338

HEAT DISSIPATION FROM TURBULENT OPEN CHANNEL FLOW,
Georgia Inst. of Tech., Atlanta. School of Civil Engineering.
For primary bibliographic entry see Field 5B.
W75-04350

5E. Ultimate Disposal Of Wastes

USE AND DISPOSAL OF SOLID WASTES FROM PULP AND PAPER PRODUCTION (VYUZITIE A LIKVIDACIA PEVNYCH ODPADOV Z VYROBY BUNICINY A PAPIERA),
Vyskumny Ustav Papier a Celulozy, Bratislava (Czechoslovakia).
For primary bibliographic entry see Field 5D.
W75-03886

TREATMENT OF RESIDUAL SLUDGES: GENERALITIES AND APPLICATIONS IN THE PAPER INDUSTRY (TRAITEMENT DES BOUES RESIDUAIRES: GENERALITES ET APPLICATIONS A L'INDUSTRIE DU PAPIER),
For primary bibliographic entry see Field 5D.
W75-03898

PROBLEM DEFINITION STUDY: EVALUATION OF HEALTH AND HYGIENE ASPECTS OF LAND DISPOSAL OF WASTEWATER AT MILITARY INSTALLATIONS,
Army Medical Environmental Engineering Research Unit, Edgewood Arsenal, Md.
For primary bibliographic entry see Field 5D.
W75-04015

SOIL ADSORPTION OF HUMIC COLOR,
Nebraska Univ., Lincoln. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5D.
W75-04043

ECONOMIC ANALYSIS OF LAND TREATMENT OF MUNICIPAL WASTEWATERS,
North Carolina State Univ., Raleigh. Dept. of Economics.
For primary bibliographic entry see Field 5D.
W75-04047

IRRADIATED FUEL AND CONTROL RODS TRANSPORT FROM A DECOMMISSIONED POWER REACTOR,
Oak Ridge National Lab., Tenn.
W. A. Pryor.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tennessee, p 375-382, 2 fig, 1 tab, 3 ref.

Descriptors: *Nuclear powerplants, *Puerto Rico, *Transportation, *Fuels, *Radioactivity, Ships, Railroads, Safety, Evaluation, Documentation, Comprehensive planning, Radioactive waste disposal.
Identifiers: Fuel elements, Fuel reprocessing, Motor freight, Casks, Shipping containers, Emergency planning, Decommissioning.

The decommissioning of the Boiling Nuclear Superheater (BONUS) Reactor in Rincon, Puerto Rico, involved the transport to the continental United States of irradiated fuel elements as well as the shim and control rods for reprocessing and disposal, respectively. The responsibility was assigned by the USAEC to the Oak Ridge Operations Office. Tasks included cask selection, cask and special equipment preparation, transportation arrangements, documentation, and shipment execution. Safety considerations were factored into each phase and Safety Analysis Reports were prepared for the cask and for the fuel and control rod baskets. Trial runs with the cask and special equipment were conducted prior to shipment to Puerto Rico. The applicable regulations of the USAEC and the Department of Transportation were followed. The completed task represented the cooperative efforts of two USAEC Operations Offices and two USAEC prime contractor organizations. (See also W75-04152) (Houser-ORNL)
W75-04188

DISPOSAL OF POLLUTED DREDGINGS FROM THE GREAT LAKES AREA,
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 5B.
W75-04251

DISPOSAL/RECYCLE MANAGEMENT SYSTEM DEVELOPMENT FOR AIR FORCE WASTE PETROLEUM OILS AND LUBRICANTS.
Esso Research and Engineering Co., Linden, N.J.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-779 723, $5.75 in paper copy, $2.25 in microfiche. Report No. AFWL-TR-73-283, April 1974. 126 p, 14 fig, 16 tab, 46 ref, 2 append. F29601-73-C-0047.

Descriptors: *Oil wastes, *Waste disposal, *Management, Fuels, *Lubricants, *Oil pollution, Surveys, Military reservations, Unit costs, Economics, Ultimate disposal, Incineration, Recycling, Education, Organic compounds.

The problem of disposing of waste lubricants and contaminated fuels generated at Air Force bases was addressed. The nature and rates of generation of several waste petroleum products such as lubricating oils, hydraulic fluids, and contaminated jet fuel were considered. Present Air Force waste petroleum oils and lubricants (POLs) practices were reviewed including a description of operations at Kelly and Andrews Air Force Bases. Waste POLs data for other bases, generated by questionnaire, were also reviewed. Disposal/recycle options were identified and discussed. A general procedure for developing an effective waste POLs disposal system, for any Air Force installation, was presented, including disposal decision making criteria and the disposal decision making process. Hypothetical examples, illustrating the mechanics of the procedure, were presented. The importance of a carefully planned program for implementing the developed waste POLs/disposal procedure was described including education of base personnel, enforcement of waste product segregation, and management. Considerably high waste product values can be realized by the implementation of the described procedure. (Humphreys-ISWS)
W75-04268

INVESTIGATION FOR THE MARINE DISPOSAL OF EFFLUENTS,
Watson (J. D. and D. M.), London (England).
For primary bibliographic entry see Field 5B.
W75-04289

CONTAINING THE FLOW OF SEWAGE SLUDGE.
For primary bibliographic entry see Field 5D.
W75-04336

5F. Water Treatment and Quality Alteration

FURTHER OBSERVATIONS ON ENDEMIC FLUORIDE-INDUCED OSTEOPATHIES IN CHILDREN,
L.L.R.M. Medical Coll., Meerut (India). Dept. of Human Metabolism.
For primary bibliographic entry see Field 5C.
W75-03909

QUALITY WATER FOR HUMAN CONSUMPTION AND INDUSTRY,
Pettigrew Engineering Co. Pty. Ltd. (Australia).
For primary bibliographic entry see Field 5D.
W75-03941

SOLVING EFFLUENT PROBLEMS BY THE USE OF CENTRIFUGES,
Alfa-Laval Pty. Ltd. (Australia). Industrial Div.
For primary bibliographic entry see Field 5D.
W75-03942

FILTRATION - MEDIA SELECTION IS THE KEY TO SUCCESS,
Barrier Filters Pty. Ltd. (Australia).
J. Wright.
Australian Chemical Engineering, Vol 15, No 10, p 4-15, October 1974. 7 tab.

Descriptors: *Filters, *Filtration, *Water treatment, *Separation techniques, Waste water treatment.
Identifiers: Filtration media.

The materials available for use as filter media are reviewed in the course of providing a guide for engineers and plant managers. Their properties and applications are discussed in relation to the type of separation required, the type of filter employed, and the uses to which the filtered material is to be put. A glossary of filtration terms is provided. (Levick-CSIRO)
W75-03943

NATIONAL DRINKING WATER STANDARDS.
For primary bibliographic entry see Field 5G.
W75-03998

IS THE WATER SAFE TO DRINK. PART 3: WHAT YOU CAN DO,
Environmental Defense Fund, Washington, D.C. Water Resources Program.
R. H. Harris, and E. M. Brecher.
Consumer Reports, Vol 39, No 8, p 623-627, August, 1974.

Descriptors: *Water quality standards, *Water pollution control, *Environmental control, *Potable water, Public health, United States, Water treatment, Social participation, Water purification.

There is a great need for assuring the purity of drinking water being piped into homes and businesses by some 40,000 community water systems in the United States. Methods for achieving a higher standard of water quality were discussed in two previous articles. The role of the individual citizen is now in focus. Recommendations for reducing one's heavy metal contamination intake are as follows: let water run for a minute or so after several hours of nonuse; avoid using hot water for preparing infant's formula or cooking since hot water tends to be higher in heavy metal content, although boiling is essential for water which is frequently contaminated by bacteria; and most importantly, organize citizens groups to demand the upgrading of water quality from the community supplies while being prepared to pay the price of purification. (See also W74-10897 and W75-00718) (Leibowitz-FIRL)
W75-04019

POLLUTION AND PUBLIC HEALTH: TACONITE CASE POSES MAJOR TEST,
For primary bibliographic entry see Field 5G.
W75-04326

APPLICATION OF MICRO-CONTROLLERS MELMIC 100 TO WATER TREATMENT FACILITIES, (IN JAPANESE),
Mitsubishi Heavy-Industries Ltd., Tokyo (Japan).
For primary bibliographic entry see Field 5D.
W75-04338

5G. Water Quality Control

INSTITUTIONAL FRAGMENTATION AND POLICY INNOVATION: THE CASE OF FEDERAL WATER POLLUTION CONTROL,
Arizona Univ., Tucson. Inst. of Government.
H. M. Ingram, S. J. Ullery, and B. A. Wright.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-239 105, $9.25 in paper copy, $2.25 in microfiche. Completion Report, January 1975. 316 p. OWRT B-034-ARIZ(1). 14-31-001-4057.

Descriptors: *Water policy, *Political aspects, *Administrative agencies, *Legislation, Institutional constraints, Institution, *Federal Water Pollution Control Act, Legal aspects, Costs, Water pollution control.
Identifiers: Institutional fragmentation, Policy innovation, *Decentralization.

This research questions the assumption that the fragmentation of institutional arrangements in water resources necessarily leads to distributive, incremental policy. It investigates the possibility that fragmentation and the multiplicy of actors and decision centers associated with a decentralized legislative system is appropriate to innovation and responsiveness of policy. Federal Water Pollution Control Policy from 1956 to 1972 is the focus of analysis. A framework for monitoring innovations in policy content as perceived by key actors is applied to landmark bills. The study concludes that water pollution control bills have been composites of different dimensions and that policy change has occurred unevenly through time. The patterns of legislation-building and consent-building on the 1956, 1965 and 1972 bills are described in detail. The report concludes that the fragmented, decentralized - Congress is especially well suited to innovations in complex, multidimensional legislation.
W75-03851

PUMPING APPARATUS FOR SKIMMING AND RECOVERING AN OIL LAYER FROM A BODY OF WATER,
Patents and Developments A/S, Nesttun (Norway). (assignee)
F. Mohn.
US Patent No 3,853,767, 3 p, 2 fig, 4 ref; Official Gazette of the United States Patent Office, Vol 929, No 2, p 775, December 10, 1974.

Descriptors: *Patents, *Skimming, *Oil spills, *Oil pollution, *Pollution abatement, Water quality control, Water pollution control, *Separation techniques, Pumping, Equipment.

An oil pump is surrounded by a bowl or disc, the periphery of which is adapted to be positioned exactly at the plane of separation between water and oil. This precise adjustment can be done by means of the adjustable floats. The periphery of the disc will then, when correctly positioned, effect the first separation of oil from water. The oil pump is disposed in the center of the bowl or disc and, in order further to separate the oil from the water also at the center portion of the bowl, a chamber may be provided having inlets which are aligned with or somewhat lower than the periphery of the bowl, the oil concentration over the central portion of the bowl being substantially greater than that outside. In order that the oil-covered water can be brought to the bowl in large amounts, a plate is arranged beneath the bowl which is provided at its center with a powerful pump for circulation of the water. When this pump is in operation, large amounts of surface water will be drawn toward the bowl and the plate and, on flowing over the plate to the pump, the oil will trickle over the periphery of the bowl together with very small amounts to water. The water is drained from the central portion of the bowl through channels which open toward the plate. (Sinha-OEIS)
W75-03865

USE OF SULFUR FOR COMBATTING OIL SPILLS,
Amoco Production Co., Tulsa, Okla. (assignee)
L. W. Jones.
US Patent No 3,844,941, 5 p, 11 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 927, No 5, p 2093, October 29, 1974.

Descriptors: *Patents, *Oil spills, *Oil pollution, *Pollution abatement, Water quality control, *Water pollution control, *Sulfur, *Separation techniques, Gravity.
Identifiers: Gravity separation.

A system is described for combatting the problems which occur when oil is spilled upon a body of water. Sulfur is spread over the spilled oil to hold the oil mass together to permit it to be easily removed from the body of water. Molten sulfur is sprayed as very fine strands over and around the periphery of an oil spill to enmesh the oil in a sulfur web and keep it confined. In another embodiment, sulfur powder is spread over the oil and tends to hold it together. In those cases where sinking of the oil is the most practical solution to the oil spill problem, greater amounts of powdered yellow sulfur, e.g., at least about three parts by weight of sulfur to one part crude oil, is applied. The oil captured by the sulfur is easily recovered with the sulfur and separation of the oil and sulfur is easily obtained by heating and gravity separation. (Sinha-OEIS)
W75-03869

SKIMMING APPARATUS,
L. Bagnulo.
US Patent No 3,853,768, 4 p, 1 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 929, No 2, p 776, December 10, 1974.

Descriptors: *Patents, *Oil spills, *Oil pollution, *Pollution abatement, Water quality control, Water pollution control, *Skimming, Flotsam, Equipment, Separation techniques.

A chamber is adapted to be partly submerged in a body of liquid. Means are provided for admitting liquid into the lower zone and the liquid in the chamber is maintained at a height sufficient so as to allow substances flowing on the admitted liquid to rise into the float inside the upper zone. Skimmed liquid is discharged at a lower portion of the lower zone and the floating substances are removed from the upper portion. (Sinha-OEIS)
W75-03870

APPARATUS AND METHOD FOR EFFECTING SEPARATIONS,
L. Mercuri.
U.S. Patent No 3,844,944, 4 p, 6 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 927, No 5, p 2094, October 29, 1974.

Descriptors: *Patents, *Oil spills, *Oil pollution, *Water pollution control, Water quality control, *Separation techniques, Gravity, Equipment, Pollution abatement.
Identifiers: *Gravity separation, Immiscible liquids.

A series of separation chambers is provided each of which, in a downstream fashion, is shorter in height or is at a lower point relative to gravity than its preceding separation chamber. Separations occur in a given chamber and water which has been treated is passed from it to the next lower chamber for further treatment. At each stage the pollutant is removed until potable or pollutant-free water is obtained. The removal of oil or other pollutant is effected by allowing it to flow into the hold of a ship or by passing it to some other reservoir. The water that emerges at the final stage contains little or no oil or other pollutant, and is allowed to flow directly back into the sea, lake or river in a continuous fashion. The method and apparatus provides the separation of oil and water

without the use of any counterflowing processes or turbulence effects. The flow of the liquids is in effect in a straight continuous line. There are no reversals of flow nor are any tortuous paths of liquid travel needed. The separation containers are of sufficient size to accommodate large quantities of liquids, and the filling of the initial container and the continuous pumping of materials into it can be at a rate that is commensurate with the separations that are occurring in the successive containers. Visual gauges can be place on each of the containers to allow ready observation of the status of the mixture in each container. (Sinha-OEIS)
W75-03872

GUIDE TO WATER CLEANUP MATERIALS AND METHODS,
For primary bibliographic entry see Field 5D.
W75-03880

STUDIES ON THE USE OF OZONE IN WATER AND WASTE WATER PURIFICATION (UNTERSUCHUNGEN ZUR ANWENDUNG VON OZON BEI DER WASER- UND ABWASSER-REINIGUNG),
For primary bibliographic entry see Field 5D.
W75-03889

AN ALARMING SYSTEM FOR HIGH-SOLIDS WHITE WATER,
M. MacLeod.
Pulp and Paper, Vol 48, No 11, 116-120, October, 1974. 8 fig.

Descriptors: *Pulp wastes, *Monitoring, Discharge(Water), Water pollution sources, *Wisconsin, Effluents, Pulp and paper industry, Conductivity, Pollution abatement, Waste water(Pollution), Water pollution control, Dissolved solids, Closed conduits, Sewers, Instrumentation.
Identifiers: *White water.

Green Bay Packaging Co. (Green Bay, Wisconsin) produces about 200 tons/day of neutral sulfite semichemical pulp which is combined with recycled waste paper to make about 300 tons/day of corrugating medium. A monitoring and information system has been installed to indicate when and where process upsets occur in a closed mill system. Conductivity sensors in the monitoring system will detect the intrusion of high dissolved solids white water into the clean sewers, since conductivity has been found to correlate well with dissolved solids in the mill's effluent stream. A leak of white water into a clean sewer will be discovered by one of the six strategically located conductivity sensors which will then set off an alarm on the annunciator panel in the paper tester's laboratory. (Sykes-IPC)
W75-03901

HOW TO REDUCE BOD LEVELS FROM SIZE-PRESS STARCHES,
National Starch and Chemical Corp., New York.
K. Bristol.
Pulp and Paper, Vol 48, No 10, p 98-99, September, 1974. 2 tab, 2 ref.

Descriptors: *Pulp wastes, *Pollution abatement, *Biochemical oxygen demand, *Water pollution sources, Hydrogen bonding, Water pollution control, Pulp and paper industry, Chemicals, Additives, Costs, Economics.
Identifiers: *Starch, Sizing agents, Size-press(Paper machine).

In paper mills using starch at the size-press, a significant amount of the starch can return to the wet-end with recycled broke. Anionic or nonionic starches are not retained on the fibers on repulping, but are dispersed in the white water and eventually leave the mill in the liquid effluents, contributing to BOD. Cationic starches, which bond to fibers electrochemically, rather than by hydrogen bonding, tend to stay with the repulped fibers and contribute substantially less BOD to mill effluents. Cases are cited illustrating this effect, as well as cost reductions in secondary treatment attributable to the use of cationic starches. (Hansen-IPC)
W75-03906

SPILL PREVENTION AND CONTROL ASPECTS OF PAPER INDUSTRY WASTE WATER MANAGEMENT PROGRAMS,
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
G. Gove, and J. J. McKeown.
NCASI Stream Improvement Technical Bulletin, No 276, 72 p, August, 1974. 8 fig, 3 tab, 18 ref, 3 appendices.

Descriptors: *Pulp and paper industry, *Water management(Applied), *Oil spills, *Chemical wastes, Chemicals, Accidents, Disasters, Water pollution sources, Legislation, Federal Water Pollution Control Act, Water Quality Act, Water pollution, Hazards, Management, Planning.

Discussed are: general planning for spill prevention, control, and containment; special aspects of oil storage and handling; storage and spill prevention of process chemicals in the pulp and paper industry; and spill control planning strategy. Current EPA regulations covering oil spills, excerpts from the Federal Water Pollution Control Act Amendments (1972) covering hazardous substance liability, and proposed EPA rules covering the designation and removability determination of hazardous substances are included. (Buchanan-IPC)
W75-03912

WATER POLLUTION AND CONTROL,
Rivers House, Glasgow, (Scotland).
For primary bibliographic entry see Field 5B.
W75-03915

CRITERIA FOR REGIONALIZATION OF WATER AND WASTE MANAGEMENT SYSTEMS,
Pennsylvania State Univ., University Park. Dept. of Economics.
For primary bibliographic entry see Field 5D.
W75-03946

PROTECTING CREEKSHEDS: DEVELOPMENT AND EVALUATION OF A METHOD TO MANAGE SMALL, URBANIZING WATERSHEDS THROUGH LOCAL GOVERNMENT ACTIONS,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03947

PROTECTING CREEKSHEDS, ANALYSIS AND ACTION,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03948

UNITED STATES V. REPUBLIC STEEL CORPORATION (PROSECUTION FOR UNLAWFUL DISCHARGE OF COAL TAR INTO A RIVER).
491 F 2d 315 (6th Cir 1974).

Descriptors: *Ohio, *Judicial decisions, *Rivers and Harbors Act, *Water quality control, Law enforcement, Legal aspects, Water law, Legislation, Legal review, Water Quality Act, Federal government, Federal jurisdiction, Non-structural alternatives, Water pollution, Water quality, Water pollution sources, Water pollution control, Water policy, Adjudication procedure.
Identifiers: *Water Quality Improvement Act, *Hazardous substances(Pollution), Evidence.

The United States government charged the defendant corporation with violation of the Rivers and Harbors Act by making a discharge of coal tar into a river. Immediately after the discharge had occurred, the defendant had notified the Coast Guard, pursuant to its obligation under the Water Quality Improvement Act of 1970. The government filed a criminal information against the defendant, based upon facts contained in the notification and facts obtained during subsequent investigation. The defendant moved to suppress this evidence, relying upon section 11 of the Water Quality Improvement Act, which provides that information derived from notification made pursuant to statute by any 'person in charge' shall not be used against 'such person' in prosecution for violation of antipollution laws. The United States District Court granted the motion and dismissed the case. The Sixth Circuit Court of Appeals affirmed the lower court's holding, and ruled that the statutory safeguard applied to corporations as well as natural persons. The court added, however, that any prosecution based on evidence other than the notification or information acquired by exploration of such notification was not excluded by the statutory safeguard. (Deckert-Florida)
W75-03992

UNITED STATES V. KENNEBEC LOG DRIVING CO. ET AL. (SUIT BY GOVERNMENT TO ENJOIN LOG-DRIVING ACTIVITIES ON UPPER KENNEBEC RIVER).
For primary bibliographic entry see Field 6E.
W75-03996

NATIONAL DRINKING WATER STANDARDS.
Journal Water Pollution Control Federation, Vol 45, No 8, p 1637-1638, August 1973.

Descriptors: *Water Pollution Control Act, *Federal legislation, *Water quality control, *Water quality standards, Water requirements, Enforcement, Water control, Maintenance, Water pollution control, Administrative agencies, Water resources development, Adoption of practices.
Identifiers: *Safe Drinking Water Act of 1973.

After passing the Water Pollution Control Act Amendments in 1972, Congress began considering the question of national drinking water standards. Several states have adopted standards established in 1914 by the Public Health Service for drinking water quality. These standards have been updated several times, the latest revision was in 1962. Drinking water is contaminated by various sources, and contamination has been found in many regions. On June 22, 1973, the Senate passed the Safe Drinking Water Act of 1973 which gives the Environmental Protection Agency (EPA) the power to set maximum limits on the level of contaminants permitted in drinking water and to enforce those standards if the states fail to do so. The bill also directs the EPA to develop rules for the operation and maintenance of drinking water systems. The EPA administrator will be required to propose nationwide primary and secondary drinking water standards within 180 days of the law's enactment. Enforcement of standards will be the responsibility of the individual states. EPA may step in if states fail to act. Federal funding is provided to assist the states in establishing and maintaining their programs and to support research. Penalties for violations are set forth. (Sperling-Florida)
W75-03998

CUTBACK IN COSTRUCTION FUNDING STIRS DOUBT ON WATER QUALITY GOALS.
Journal Water Pollution Control Federation, Vol 45, No 2, p 199-202, February 1973. 1 fig.

Descriptors: *Water pollution, Abatement, *Impaired water quality, *Water pollution control, *Pollution abatement, *Navigable waters, Wildlife management, Fish resources, Waste treatment, Aquatic environment, Legislation, Water law, Water quality control, Research, Technology, Water resources development, Waste water treatment, Conservation, Wildlife resources, Environmental effects, Water policy, Adoption of practices.

President Nixon vetoed the $25 billion water pollution control bill. After Congress overrode the veto, the President impounded $6 billion of the $11 billion authorized by Congress for water pollution control grants in the next two fiscal years. The bill provides for the elimination of the discharge of pollutants into navigable waters by 1985; protection of fish, wildlife, and recreation; application of technology to achieve secondary treatment for publicly owned treatment works; and the application of technology to produce the best practicable waste treatment. Expenditures for contract grant authority are set forth in the act. State allocations will be made on the basis of need rather than population. The impoundment of funds has given rise to a difference of opinion concerning its possible effects on the water pollution control effort. One side feels that the decrease in funding will have little effect on the purposes of the act while the other side feels that without funding, the entire law becomes useless. Spokesmen from various states agree that the allocation of money is the controlling factor in the Nation's ability to control water pollution adequately. (Sperling-Florida)
W75-03999

REGIONAL MANAGEMENT OF WASTE SYSTEMS,
Maryland Environmental Service, Annapolis.
For primary bibliographic entry see Field 5D.
W75-04000

THE PHILOSOPHY OF S.2770,
Senate, Washington, D.C.
E. S. Muskie.
Journal Water Pollution Control Federation, Vol 44, No 3, p 522, March 1972.

Descriptors: *Legislation, *Water pollution control, *Water quality standards, *State governments, Ecology, Federal government, Effluents, Conservation, Water quality control, Water quality, Water pollution sources, Waste water disposal, Waste water treatment, Legal aspects, Water Quality Act, Permits, Waste water disposal, Regulation, Specifications, Water law, Political aspects, Environmental sanitation.
Identifiers: *Federal Water Pollution Control Act Ammendments of 1972.

The Federal Water Pollution Control Act Amendments of 1972 propose a major change from water quality standards to effluent limits for the federal water pollution control system. It is virtually impossible to establish a precise relationship between an effluent and water quality except where a single source of pollution contributes the entire waste load to the receiving water. The Refuse Act of 1899 provides a convenient way to take polluters to court for discharging without permits. The most effective way to stop pollution of the waterways is to stop the discharge of pollutants into receiving waters. The Senate recommends this goal be reached by 1985. Critics say there are technical and economic limits on the degree to which the discharge of pollutants may be stopped. Reasonable costs is the basic test under this law, for eliminating discharges. The target date is intended to spark the research and development of the technology now lacking. The law gives the states an opportunity to take the lead in setting effluent limits within the context of a national law that insures against capricious and uneven application of that law. (Sperling-Florida)
W75-04001

UNITED STATES V. HOLLAND (ACTION TO ENJOIN UNLAWFUL FILLING OPERATIONS).
For primary bibliographic entry see Field 6E.
W75-04005

WPCF ADOPTS RESOLUTIONS AIMED AT EASING PROBLEMS OF WATER LAW.
Soap and Detergent Association, New York.
Water in the News, Soap and Detergent Association, New York. p 1-2, November-December 1974.

Descriptors: *Water pollution, *Water treatment, *Water law, *Administration, *Federal government, State governments, Water policy, Water pollution control, Water quality standards, Government finance, Cost-benefit analysis, Construction, Planning, Administrative agencies, Permits, Industrial wastes, Governmental interrelations, Evaluation, Long-term planning.
Identifiers: Environmental policy, Effluent limitations.

At the forty-seventh annual conference of the Water Pollution Control Federation recommendations were made for more effectively dealing with problems of water law and administration. It was suggested that primary authority be shifted from the federal government to the states. Policy in regard to secondary treatment standard and effluent limitation should be revised to insure that local conditions and cost effectiveness be considered. Federal funding for construction grants and state programs need to be at adequate levels and as such the commitments need to be long term without vacillations in funding. Among administrative recommendations are that funds commensurate with documented needs for research, manpower, and training be sought and utilized, and that the use of delegating mechanisms be broadened to reduce staggering paperwork demands. The administrator of the Environmental Protection Agency reported that the bulk of major permits for both municipal and industrial dischargers will be issued by the end of the year. (Sperling-Florida)
W75-04009

GUIDELINES FOR PREPARATION OF ENVIRONMENTAL STATEMENTS FOR REVIEWING AND COMMENTING ON ENVIRONMENTAL STATEMENTS BY OTHER FEDERAL AGENCIES.
Environmental Protection Agency, Seattle, Wash. Region X.
For primary bibliographic entry see Field 6G.
W75-04010

EFFECT OF A KILLED SOD MULCH ON NITRATE MOVEMENT AND CORN YIELD,
Kentucky Univ., Lexington.
For primary bibliographic entry see Field 3F.
W75-04013

STANDARDS, ADMINISTRATION, AND SURVEYS, (LITERATURE REVIEW),
Delaware River Basin Commission, Trenton, N.J.
R. Porges, and S. P. Gross.
Journal Water Pollution Control Federation, Vol 46, No 6, p 1625-1643, June, 1974. 216 ref.

Descriptors: *Water pollution control, *Federal Water Pollution Control Act, Standards, Administration, Surveys, Water quality standards, Biota, Wildlife, *Bibliographies, *Reviews.

Water quality standard guidelines for revision and general development under the Federal Water Pollution Act Amendments of 1972, as applied to interstate and intrastate waters were published by EPA. Objectives, goals, policy guidelines, legislative requirements and other salient issues were examined. Revised water quality standards were proposed for the naviagable waters of Illinois, West Virginia, Puerto Rico, New Jersey, and New York. The National Academy of Sciences-National Academy of Engineering's Environmental Studies Board has completed a revision of 'Water Quality Criteria' issued in 1968. Criteria for six classes of water uses, such as recreation and aesthetics, public water supplies, both fresh and marine water aquatic life and wildlife, agricultural use and industrial supplies, were established. Criteria were presented in numerical and verbal form for the physical, chemical, biological and esthetic determinants of water quality for the six uses. The Federal Act required the EPA to publish criteria for water quality and information for restoration and maintenance of aquatic integrity, and water measurement and classification. The development of effluent limitation guidelines is examined. Level I technology was based on the average of the best performance by plants of different sizes, ages, and unit processes in each industrial category. (Leibowitz-FIRL)
W75-04014

POLLUTION CONTROL IN JAPAN-A SURVEY.
Process Biochemistry, Vol 9, No 5, p 15, 34, June, 1974. 1 tab.

Descriptors: *Water pollution, Water pollution sources, Pollution abatement, *Water pollution control, Equipment, Foreign countries, *Legislation, Planning, Water resources development, *Regulation, Water quality standards.
Identifiers: *Japan.

The overall picture of water pollution in Japan is very serious, in both Japan's fresh and marine waters. The Anti-pollution Act of 1970 is one of the most comprehensive environmental protection laws. It is a framework of definitions and plans of action. The two series of effluent standards set for water quality are for protection of health and for environmental preservation. The pollution control market is one of the fastest growing areas in the Japanese economy. The market has been mainly concerned with solving existing problems, developing, purchasing and marketing the existing technology. However, the development of preventive measures is becoming more important. The developments are in three areas: new recovery techniques; the detailed application of these and existing technology to specific industrial problems; and the redesign of processes to avoid initial pollution. (Orr-FIRL)
W75-04017

PROGRESS IN SATISFYING ENVIRONMENTAL REQUIREMENTS,
Ebasco Services, Inc., New York.
W. D. Patterson.
Public Utilities Fortnightly, Vol 94, No 3, p 13-27, August 1, 1974. 9 fig, 4 tab.

Descriptors: *Environmental control, *Legislation, Clean Air Act, Federal Water Pollution Control Act, Industrial wastes, Chemical pollution, Waste water treatment, Water quality control, *Regulation, Water requirements.
Identifiers: *National Environmental Policy Act.

Legislative and regulatory developments at the Federal level concerning environmental control are reviewed. The Clean Air Act Amendments of 1970 gave the EPA authority to establish safe ground level concentrations of air pollutants, and to enforce achievement of such levels through the application of controls. EPA has promulgated two sets of ambient air quality standards, specifying maximum acceptable ground level concentrations of pollutants. Primary standards are those strict enough to protect public health. These standards are to be reached nationally by 1975, regardless of expense. Secondary standards represent the protection of the public welfare. These standards specify levels necessary to protect vegetation, animals, and materials from hazardous contamination; national attainment is expected sometime between 1978 and 1980. State ambient air quality standards will also have to be met, and in some

cases, with greater rigidity. Since the enactment of NEPA, significant progress has been made. Legislation now pending should provide a basis for effective land-use control. New equipment and technology has had a significant impact on industrial waste quality, evidenced in increased expenditures since 1970. The power facility siting process is an indication of progress in the environmental area. Development of a national land-use policy and more specific interpretations of existing regulations would enhance environmental protection. (Leibowitz-FIRL)
W75-04018

IS THE WATER SAFE TO DRINK. PART 3: WHAT YOU CAN DO,
Environmental Defense Fund, Washington, D.C. Water Resources Program.
For primary bibliographic entry see Field 5F.
W75-04019

LAW, (LITERATURE REVIEW),
Georgia Univ., Athens. Inst. of Government.
J. O. Smith.
Journal Water Pollution Control Federation, Vol 46, No 6, p 1618-1625, June, 1974. 70 ref.

Descriptors: *Law enforcement, *Federal Water Pollution Control Act, Water pollution, Water quality control, Waste water treatment, Effluent control, Groundwater, Management, *Bibliographies, *Reviews.
Identifiers: Citizen suits, Federal water quality legislation(Pre-1972).

The amendments of 1972 to the Federal Water Pollution Control Act dominated the literature concerning federal efforts in water quality control. The inadequacies of past federal efforts in this area and the important parts of the new amendments were discussed by McMahon. Rasmussen and Kuchenbacker concluded that the improved enforcement procedures, including citizen suits, the right to enter and monitor effluent discharge, and the new permit program, should have a significantly positive effect on the curbing of water pollution. Coleman, on the other hand, criticized the new amendments, considering the possibility of the development of problems like those imputed to the Clean Air Act, such as alleged blackmailing of the states by the EPA. The amendments use of technologically-based standards was criticized by Rauch, who then concluded that this policy, and its cost factors, would perpetuate a negative incentive for the technological development necessary to meet the final goal. Finnell examined the Florida Environmental Land and Management Act of 1972. The trust doctrine of Virginia's new constitution dealing with natural resources was examined by Brion. (Leibowitz-FIRL)
W75-04020

EPA'S POLLUTION CONTROL GOALS TAKE BROADSIDE IN SEATTLE.
Engineering News Record, Vol 193, No 5, p 15, July 25, 1974.

Descriptors: *Water quality control, *Water pollution control, *Waste water treatment, Economics, Pacific Coast region, Water policy, Biochemical oxygen demand, Water quality standards, Tertiary treatment.

The federal water pollution control program came under fire in Seattle from public officials. John D. Parkhurst of the Water Pollution Control Federation attacked what he claimed was the 'economic madness' of the EPA's standard for secondary treatment. The general manager of the Los Angeles County Sanitation District predicted the secondary treatment would cost more than $100 billion. Richard S. Page, executive director of the Municipality of Metropolitan Seattle, claimed that the 85% removal of BOD required by the EPA would produce no significant benefit to the quality of water on the Pacific Coast. The director asserted that $650 million would be needed to meet this requirement on the Pacific Coast alone. (Leibowitz-FIRL)
W75-04023

ON POLLUTION CONTROL.
New Civil Engineer Special Review, Vol 95, p 53, May, 1974.

Descriptors: *Water pollution control, *Oil spills, *Oil pollution, Legislation, Water quality control, Pacific Coast region, Regulation, Continental shelf, Atlantic Ocean.
Identifiers: Santa Barbara channel(Calif), North Sea, Continental Shelf Act of 1964, Petroleum Regulations of 1966, Prevention of Oil Pollution Act of 1971.

California waters suffered from an excess of pollution in 1969. In the Santa Barbara channel 100,000 barrels of crude oil were spilled due to a blowout. Further eruptions necessitated the sealing of the fissure in March, with continued seepage following for longer than a year. In December, a 120 sq km oil slick developed from a Union Oil pipeline break. A ban on oil drilling was then instituted by the state of California. Because of environmental protest, not much more than seismic surveys have been done in the U.S. Atlantic or Pacific continental shelves. Legislation covering pollution control in the UK sector of the North Sea is the Continental Shelf Act of 1964, which makes the discharge of oil from drilling and production operations in that area an offense, with a license dependent upon the operator's liability for control of any such discharge. The Petroleum Regulations of 1966 recommend that oil escape into licensed waters be avoided by all necessary preventive measures. Relevant legislation was later added in the form of the Prevention of Oil Pollution Act of 1971. (Leibowitz-FIRL)
W75-04024

WHITHER WATER.,
For primary bibliographic entry see Field 6B.
W75-04025

SOLID WASTE DISPOSAL BY LAND BURIAL IN SOUTHERN INDIANA,
Indiana Univ., Bloomington.
For primary bibliographic entry see Field 5B.
W75-04035

ADDITIONAL STUDIES OF THE EFFECTS OF SALT MARSH IMPOUNDMENTS ON MOSQUITO POPULATIONS,
North Carolina State Univ., Raleigh. Dept. of Entomology.
J. C. Dukes, R. Axtell, and K. L. Knight.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-239 235, $3.75 in paper copy, $2.25 in microfiche. North Carolina Water Resources Research Institute, Raleigh, UNC-WRRI Report No. 102, December 1974. 38 p, 15 fig, 14 tab, append. OWRT B-057-NC(2). 14-31-0001-3919.

Descriptors: *Mosquitoes, *Mosquito control, Impoundments, Public health, *Salt marshes, Flooding, Water level fluctuations, *North Carolina, Vegetation, Water pollution control.
Identifiers: Carteret County(NC), *Aedes sollicitans, Juncus marsh, *Anopheles mosquitoes.

A comparative study of three adjacent areas (a natural marsh, a partially completed impoundment, and a completed mosquito control impoundment) evaluated the effectiveness of an impoundment for salt marsh mosquito control. Potential mosquito producing sites in both the natural marsh and the partially completed impoundment were comparable in vegetative cover. Neither area produced mosquitoes - the natural marsh was inundated by tides too often; in the partially completed impoundment, the dikes eliminated normal tidal flooding. Within the impounded marsh, Juncus roemerianus Scheele (black needlerush) remained in several large stands. However, in vast areas, only stumps of Juncus remained. Most of these and other marginal areas had been invaded by Typha spp. (cattail). Numerous patches of Spartina patens (Aiton) and Distichlis spicata (L.) were still thriving around the perimeter of the dike and on high ground within the interior. Only two larvae of the salt marsh species Aedes sollicitans (Walker) were recovered within the impoundment. Anopheles mosquito larvae were collected in small numbers from areas containing thick mats of vegetation (Spartina patens, D. spicata and B. monnieri) and flooded with less than six inches of water. During summer months, the water level dropped 6 inches due to evaporation, causing most mosquito breeding sites to become unproductive. Areas in deeper water, or where the vegetation was submerged, were not mosquito producers. Salinity within the impoundment was 0 parts per thousand throughout the entire research period. (McJunkin-N.C. State)
W75-04048

PHOSPHORUS DETERGENT BAN-HOW EFFECTIVE,
Pieczonka Consultants, Lackawanna, N.Y.
For primary bibliographic entry see Field 5D.
W75-04109

SETTING UP A SPECIAL COLLECTION ON WATER POLLUTION IN A UNIVERSITY LIBRARY,
Case Western Reserve Univ., Cleveland, Ohio. Sears Library.
J. Friedlander.
Special Libraries, Vol 65, No 7, p 291-296, July, 1974. 12 ref.

Descriptors: *Libraries, *Classification, *Information exchange, *Water pollution, *Lake Erie, *Data collections, Environmental control, Documentation, Publications, Great Lakes.

The Cleveland area has three interdisciplinary research teams which are studying the pollution of Lake Erie. Water pollution library materials are distributed in various locations and with varying subject classifications. A special library collection was established in the university library, and the complexity of identifying and collecting reports in the field of environment, along with locating other water pollution agencies and recording locations of other local collections of data are elucidated. The functions of the Lake Erie Study Collection as a special library are considered in relation to the project members' research. (Leibowitz-FIRL)
W75-04118

CONSIDERATION OF BACKGROUND IN DEVELOPMENT OF ENVIRONMENTAL STANDARDS,
Georgia Inst. of Tech., Atlants. Office of Interdisciplinary Programs.
A. A. Moghissi, and M. W. Carter.
In: CONF. 741018, Proceedings of the Eighth Midyear Topical Symposium of the Health Physics Society, October 21-24, 1974, Knoxville, Tenn., p 17-22, 1 tab, 1 ref.

Descriptors: *Radioactivity, Environment, *Human population, *Standards, *Safety, Evaluation, Assessment, Background radiation, Geographical Regions, Geology.
Identifiers: *Environmental standards.

Environmental standards for a class or for individual pollutants are usually derived from animal and human biological effects and kinetics data and/or in comparison with background levels. Once such standards are adopted they are applied to the entire nation without considering the signifi-

cant differences in background levels in various geographical locations. Fallacies of this approach are identified and described using the example of environmental radiation standards. (See also W75-04152) (Houser-ORNL)
W75-04155

EXPOSURES DURING THE TRANSPORTATION OF RADIOACTIVE MATERIALS,
American Insurance Association, Washington, D.C.
For primary bibliographic entry see Field 5C.
W75-04189

FUNCTIONAL PLAN FOR WATER SUPPLY AND WASTE WATER DISPOSAL FOR THE SANTEE-WATEREE PLANNING DISTRICT,
LBC and W Consultants, Columbia, S.C.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-226 790, $4.75 in paper copy, $2.25 in microfiche. Prepared for Santee-Wateree Regional Planning Council, Sumter, S.C. June, 1973. 84 p, 8 fig, 5 append. HUD SC-04-12-1003.

Descriptors: *Water utilization, *Costs, *Water supply, *Water management(Applied), *Sewage systems, *Waste treatment, *Waste water disposal, Optimum development plans, Standards, Water allocation, Water distribution, Water resources, Sewage, Development, South Carolina.
Identifiers: Santee-Wateree Planning District(SC), Clarendon Co.(SC), Kershaw Co.(SC), Lee Co.(SC), Sumter Co.(SC).

This functional plan supplements the Water and Sewer Plan and Program prepared in May 1972 and is designed to provide a flexible guide for the development of water supply and waste water treatment facilities to meet the needs of Clarendon, Kershaw, Lee, and Sumter Counties. Purposes of report are to update inventory data; to scrutinize systems proposed to meet future needs; to prepare cost estimates for proposed systems and indicate priorities; and to present recommended procedures to serve as a guide for orderly development. Prime consideration was given to cost minimization and optimization of water resource uses. Based on established system design and water supply planning standards, an inventory of water supply and sewerage facilities is detailed including maps, short and long range plans, water usage data, population predictions, and future programs. A section on the relation of water and sewer systems capacity to area development summarizes the ability of the counties to absorb increased growth without adverse effects. (Salzman-North Carolina)
W75-04195

WATER AND SEWER MANAGEMENT STUDY, ALTAMAHA GEORGIA SOUTHERN AREA.
Altamaha Georgia Southern Area Planning and Development Commission, Baxley, Ga.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-232 219, $4.25 in paper copy, $2.25 in microfiche. Final report. May 1974. 121 p, 27 fig, 5 tab, 2ref, 2 append. CPA-GA-04-06-1022.

Descriptors: *Waste water treatment, *Sewerage, *Sewage treatment, *Water management(Applied), *Water distribution, *Water supply development, Planning, Management, Administration, Costs, Sewage disposal, Georgia, Waste water.
Identifiers: *Altahama Georgia Southern Area, Intergovernmental Coordination of Water and Sewer Services, Improved fiscal policies for water and sewer management, Audits, Fiscal policies.

Prepared to provide governing bodies in southern Georgia responsible for the development and operation of public water and sewer systems with a guide for improving operation and management, this study applies to Appling, Bulloch, Candler, Evans, Jeff Davis, Tattnall, Toombs, and Wayne counties. Present administrative, management, and operation methods are analyzed. Alternative methods for the provisions of more efficient administration and management are evaluated for economic feasibility. Recommendations for short range (5 year) and long range (20 year) improvements include: intergovernmental coordination of services with engineering feasibility studies of consolidation of Lyons-Santa Claus water and sewer systems, supplying water service to Higgston from Vidalia system, and establishment of a water supply authority to consolidate administration, management and operations; improved fiscal policies with annual budget and audit plus biennial rate review; upgrading skills in water and sewer administration through programs offered by Georgia's Institute of Government; and certification of all operators of water and sewer services. (Salzman-North Carolina)
W75-04196

PLANNING FOR WATER QUALITY IN THE VIRGIN RIVER SYSTEM IN THE STATE OF UTAH: A PROGRAM FOR DEVELOPING A COMPREHENSIVE WATER QUALITY MANAGEMENT PLAN.
Utah Water Research Lab., Logan.
Prepared for State of Utah Bureau of Environmental Health. PRWG-142-2, March, 1974. 88 p, 11 fig, 8 tab, 27 ref.

Descriptors: *Water quality, *Planning, *Management, *Water pollution control, *Baseline studies, *River basins, *Analytical techniques, Federal Water Pollution Control Act, Data collections, Data processing, Hydrologic data, Political aspects, Utah, Dissolved oxygen, Heated water.
Identifiers: *Virgin River(Utah), *Demographic activities, Effluent limitations.

Baseline information is developed which will allow water quality management planning for the Virgin River system. An initial source of background information and data is provided to facilitate the participation of local public officials, community leaders and citizens in water quality planning for the basin. The Physical, chemical, economic, political, and demographic activities which have an impact upon water quality within the basin are presented. Water quality standards applied to the Virgin River system, as described by the Utah State Division of Health and accepted by the Environmental Protection Agency are defined as class 'C' Water Quality Requirements. Specific reaches have been further classified for thermal discharge to prevent undue heating of the water and to limit the minimum level of dissolved oxygen in the stream. The program design, initial analysis of available data, and priority listing of water pollution problems presented provide a functional basis for developing comprehensive water quality management plans for the basin pursuant to the objectives of the Federal Water Pollution Control Act, including 1972 amendments. These plans will be an important part of implementing point source control and achieving the desired water quality programs. (See also W75-04207) (Diefendorf-North Carolina)
W75-04206

PLANNING FOR WATER QUALITY IN THE SEVIER RIVER SYSTEM IN THE STATE OF UTAH: A PROGRAM FOR DEVELOPING A COMPREHENSIVE WATER QUALITY MANAGEMENT PLAN.
Utah Water Research Lab., Logan.
Prepared for State of Utah Bureau of Environmental Health. PRWG-142-3, March, 1974. 96 p, 11 fig, 8 tab, 52 ref.

Descriptors: *Water quality standards, *Water quality, *Planning, *Management, *Water pollution control, *River basins, *Data collections, Federal Water Pollution Control Act, Baseline studies, Data processing, Analytical techniques, Hydrologic data, Political aspects, Utah, Dissolved oxygen.
Identifiers: *Sevier Lake(Utah), *Sevier River(Utah), Effluent limitations, Demographic activities, Environmental Protection Agency, Thermal discharge.

A functional planning program is presented to aid in the development of comprehensive water quality management plans for the Sevier River system. According to the Utah Division of Water Resources the Sevier River is the most completely utilized river in the U.S. The approximately 94% utilization of its water results in very little flowing into Sevier Lake which is normally dry. In Utah, water quality standards are primarily effluent standards oriented toward the effect of designated effluents on streams. Application of standards to waste effluents and to streams and lakes will lead to their improvement only if monitoring of the waters occurs and if standards are enforced. The Utah State Division of Health has described standards which have been applied to the Sevier River system and which are at least as strict as those proposed by the Environmental Protection Agency. These standards are defined as the class 'C' Water Quality Requirements. In addition, specific reaches of the Sevier system have been further classified for thermal discharge and minimal level of dissolved oxygen. The program design, initial analysis of available data, and priority listing of water pollution problems necessary for a basin plan presented here are consistent with the objectives of the Federal Water Pollution Control Act, including the 1972 amendments. (See also W75-04206) (Diefendorf-North Carolina)
W75-04207

COOLING TOWERS - BEST ACHIEVABLE THERMAL POLLUTION ABATEMENT TECHNOLOGY,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
For primary bibliographic entry see Field 5D.
W75-04223

APPLICATIONS OF SYSTEMS ANALYSIS TO INTERNATIONAL WATER RESOURCES PROJECTS,
California Univ., Davis. Dept. of Civil Engineering.
For primary bibliographic entry see Field 6A.
W75-04232

A POSITIVE LOOK AT ACHIEVEMENTS IN WATER QUALITY ENHANCEMENT,
Howard, Needles, Tammen, and Bergendoff, Alexandria, Va. Dept. of Environmental Quality and Conservation.
C. F. Zirzow.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 441-444. 5 ref.

Descriptors: *Water quality, *Water pollution control, *Water purification, *Environmental control, *Public health, Water chemistry, Quality control, Lake Erie, Great Lakes, Surface waters, Salmon, Fish, Environment, Water treatment, Pollution abatement.

The more engineers and scientists can demonstrate to the public that progress is being made in cleaning up the environment, the more likely the public is to accept the expense of finishing the job in the years ahead. It must be shown that the public's investment in environmental quality is already yielding positive returns. By noting the significance of what has already been accomplished,

new hope can be offered for the future. (See also W75-04213) (Henley-ISWS)
W75-04247

NATURAL PHOSPHATE REMOVAL MECHANISMS IN SOUTH FLORIDA LAKES,
Miami Univ., Coral Gables, Fla. Dept. of Civil Engineering.
T. D. Waite, and W. J. Fogarty.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 472-481. 11 fig, 10 ref.

Descriptors: *Phosphates, *Nutrient removal, *Phosphorus compounds, *Fertilizers, *Eutrophication, *Florida, Lakes, Environmental effects, Water pollution sources, Productivity, Nitrates, Nitrogen compounds, Water quality, Plankton, Algae, Primary productivity, Chemicals, Fertilization, Phytoplankton, Agriculture, Drainage, Analytical techniques, Chemical analysis.

Two small lakes in the South Florida area were artificially fertilized with phosphate, and the rate of phosphate removal from the water column was determined. The removal rate was correlated with plant productivity and loss to the sediments. Chemical oxygen demand measurements were run on the lake water to obtain a qualitative indication of phytoplankton biomass. While all organic matter present in the lake water exerted a demand, the values were compared with productivity data for algae biomass fluctuations. After 120 days the lake was fertilized again, and the removal rate constant increased to 0.136 mg PO4/1/day. At this same time a second lake was artificially enriched and its removal rate constant was 0.137 mg/l PO4/day. The more rapid loss of PO4 from the water during the second set of tests was attributed to an increase in groundwater flow. During all the analyses the NO3-N concentration = 0.03 - 0.3 mg/1, alkalinity = 100-150 mg/1 CaCO3, and NH3-N=.05-.01 mg/1. Plant productivity analyses on the benthic macrophytes and phytoplankton were performed during the second fertilization experiments. Results indicated that in one lake macrophyte growth represented 25-50% of the phosphate removal while 0.5-9% was removed by the phytoplankton. In the second test lake macrophyte growth accounted for 9-23% of the phosphate uptake, while 2-5% was utilized by the phytoplankton. These data indicate that greater than 50% of the phosphate added to the experimental lakes was removed by chemical precipitation. This was verified by phosphate concentrations in sediment core samples which reflected an increase after fertilization. (See also W75-04213) (Henley-ISWS)
W75-04250

AN ANALYSIS OF OIL OUTFLOWS DUE TO TANKER ACCIDENTS, 1971-1972.
Henry (J.J.) Co., Inc., Moorestown, N.J.
For primary bibliographic entry see Field 5B.
W75-04260

REGIONAL LANDFILL AND CONSTRUCTION MATERIAL NEEDS IN TERMS OF DREDGED MATERIAL CHARACTERISTICS AND AVAILABILITY; VOLUME I: MAIN TEXT,
Green Associates, Inc., Towson, Md.
R. Reikenis, V. Elias, and E. F. Drabkowski.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-780 750, $8.75 in paper copy, $2.25 in microfiche. U.S. Army Engineer Waterways Experiment Station Contract Report D-74-2, May 1974. 269 p, 9 fig, 33 tab, 138 ref. DACW 39-73-C-0141.

Descriptors: *Dredging, *Landfills, *Construction materials, Dikes, *Disposal, Sites, Surveys, Planning, Regional analysis, Data collections.
Identifiers: Hydraulic fill, Diked disposal area.

A survey of the regional needs for landfill and construction material indicated that such needs vary substantially due to population shifts and economic growth of specific regions. Generally, regional needs were determined to be in excess of available volumes of dredged material, particularly in low-lying coastal areas. The survey also revealed that there were problems to overcome before dredged material was accepted for such usage. Regional investigations indicated that, given the projected quantities of dredged material, there could be large-scale disposal of dredged material on land sites. Desirable solutions to the dredged material disposal problem could be achieved by a detailed inventory of all identified future development projects, adoption of methodologies for selection of disposal sites, development of techniques to decrease time of sediment consolidation, and identification of the most economical application of present techniques or development of new techniques. (Roberts-ISWS)
W75-04266

U.S. V. ROHM AND HAAS CO. (CONTINUOUS DISCHARGE POLLUTION ACTION UNDER REFUSE ACT).
For primary bibliographic entry see Field 6E.
W75-04290

U.S. V. LEBEOUF BROS. TOWING CO., INC. (GOVERNMENT ACTION TO RECOVER PENALTY IMPOSED BY COAST GUARD FOR GASOLINE SPILL IN OCEAN).
For primary bibliographic entry see Field 6E.
W75-04292

FREEMAN COAL MINING CORP. V. ILLINOIS POLLUTION CONTROL BOARD (APPEAL FROM OF POLLUTION CONTROL BOARD HOLDING THAT DEFENDANT MADE ILLEGAL DISCHARGES).
For primary bibliographic entry see Field 6E.
W75-04295

RESERVE MINING CO. ET. AL. V. UNITED STATES (MOTION FOR STAY OF INJUNCTION).
For primary bibliographic entry see Field 6E.
W75-04296

UNITED STATES V. BOYD (DISCHARGE OF OIL INTO NAVIGABLE WATERS).
For primary bibliographic entry see Field 6E.
W75-04298

VERMONT V. NEW YORK, ET AL. (PROPOSED CONSENT DECREE DISAPPROVED).
For primary bibliographic entry see Field 6E.
W75-04299

UNITED STATES V. IRA. S. BUSHEY AND SONS, INC. (DISCHARGE OF REFUSE INTO NAVIGABLE WATERS--OIL SPILLS),
For primary bibliographic entry see Field 6E.
W75-04300

COURTS BACK STATE'S POWER TO HALT ACID MINE DRAINAGE,
Pollution Control Guide, Vol 3, paragraph 19704, p 19181-19182, 1974.

Descriptors: *Judicial decisions, *Pennsylvania, *Legal aspects, *Acid mine water, Waste water treatment, Administrative agencies, Drainage systems, Waste water pollution, Permits, Pumping, Waste water disposal, Safety, Regulation, Water quality control, Water law, Water pollution control.
Identifiers: *State policy, Nuisance(Legal aspects), Injunctive relief.

Pennsylvanials Department of Environmental Resources has won two legal battles to curb acid mine drainage, the major cause of water pollution in the state. As a result mine operators can be required to treat all water discharged from their operations, even if the mine operator was not responsible for the pollution of the discharged water. The Department's rule that 'if you pump it out you have to treat it' had been challenged. Since pumping the drainage from the abandoned mine was essential to the safe operation of the active mine, the court concluded that it is a vital part of the complete drainage plan and therefore subject to regulation. Mine drainage does not cease to be mine drainage once mining has ceased in the mine from which it continues to drain. Mine drainage is simply waters polluted from the operation of a mine. The department could not get injunctive relief under the statutory provisions, but could get such relief under either theory of statutory or common law public nuisance. (Sperling-Florida)
W75-04301

SENATE SUBCOMMITTEE HEARS COMPLAINTS ON EPA WATER PROGRAMS.
Pollution Control Gudie, Vol 3, paragraph 19860, p 19603-19607, 1974. 5 p.

Descriptors: *Oregon, *Federal Water Pollution Control Act, *Environmental sanitation, *Environmental effects, *Administration, Administrative agencies, Coordination, Planning, Water quality control, Economic aspects, Legal aspects, Regulation, Standards, Industrial wastes, State governments, Permits, Water quality standards, Adoption of practices, Water law, Water policy.
Identifiers: *FWPCA Amendments of 1972, *Administrative regulations, Environmental policy.

The Direcetor of the Oregon Department of Environmental Quality states that in order to improve the environment people must have the desire for a high quality environment, and they must be willing to spend the money needed to improve the environment. Secondly the state's municipalities, industries, and other regulated and regulating agencies must not only support, but respect environmental programs. All aspects of the environment and their interrelation must be considered. The Federal Water Pollution Control Act and the 1972 Amendments will be the most influential basis for establishing present and future environmental programs. The Act does not, however, permit a state agency to approach environmental problems on an integrated basis. Instead the Act establishes arbitrary effluent standards that must be met by arbitrary deadlines, regardless of impacts on air quality, solid waste disposal, noise, or aesthetics. Another problem arises when permits, which are required to be issued immediately, must contain schedules to meet guidelines that have not yet been adopted. (Sperling-Florida)
W75-04302

NON-TRANSPORTATION OIL SPILL REGULATIONS.
Pollution Control Guide, Vol 3, paragraph 19936, p 19795-19797, 1973. 3 p.

Descriptors: *Regulation, *Federal Water Pollution Control Act, *Oily wastes, *Navigable waters, Transportation, Waste water disposal, Oil industry, United States, Water quality control, Adoption of practices, Planning, Administration, Administrative agencies, Industrial waste, Water pollution, Water law, Water quality, Water quality control, Oil pollution.

Identifiers: Notice, *Administrative regulations, State policy, *Environmental policy.

Notice of proposed rule-making was published pursuant to the Federal Water Pollution Control Act to prevent discharges of oil into the navigable waters of the United States and to contain such discharges if they occur. The regulations will prevent such spills by establishing procedures, methods, and equipment requirements of owners or operators of facilities engages in drilling, producing, storing, refining, distributing, or consuming oil. New facilities could achieve a higher level of spill prevention than older facilities by the use of fail-safe design concepts and innovative spill prevention methods and procedures. Older facilities could develop strong spill contingency plans and commit manpower, oil containment devices and removal equipment to compensate for existing weaknesses in the spill prevention equipment. No single standard or design could be prescribed for all non-transportation related facilities due to the varying factors of age, function and location. (Sperling-Florida)
W75-04303

WATER REUSE...SAFE DRINKING ACT...HOW SOON...HOW GOOD.
C. Heckroth.
Water and Wastes Engineering, Vol 11, No 8, p 32, 34, 36-37, August, 1974.

Descriptors: *Water pollution, *Water reuse, *Water laws, *Federal government, *State governments, Chlorination, Chemical treatment, Water purification, Toxicity, Heavy metals, *Potable water.
Identifiers: *Safe Drinking Water Act.

The 1974 American Water Works Association annual meeting considered the rising problems in the area of water use, reuse, master planning, dual systems, and the Safe Drinking Water Act. Representative Peter Kyros of Maine explained that the delay of the Act was due in part to the need for funds. Studies and adequate monitoring are needed, and these 'deficiencies give rise to technical uncertainty, which in turn impacts on our concern about having the EPA make judgments which will cause state and local governments to pour out large sums of money to clean up water supplies.' Congressmen are unsure as to whether enforcement, monitoring and reporting should rest with the states with no power of coercion or the federal government if the states should fail to take proper measures. They are also unsure as to whether standards should be set for tap water without providing operation and maintenance requirements. There is some question as to the availability of state funds to meet federal regulations. The administration's bill makes no provision to control underground injection of contaminants. Water supply administrators were seriously criticized. It was claimed that the most difficult metals to remove are arsenic, lead, cadmium and barium. Metal removal appears to function according to the efficiency of the activated sludge system nitrification. An increase in some metals has been attributed to chemical treatment. (Leibowitz-FIRL)
W75-04322

CONTROL OF WATER POLLUTION: MISCELLANEOUS PROVISIONS.
International Digest of Health Legislation, Vol 25, No 1, p 50-60, 1974.

Descriptors: *Water laws, *Public health, *Water pollution control, *Water quality, Management, Suspended solids, Toxicity, Wildlife, Birds, Aquatic life, Industrial wastes, Sewage, Discharge, Radioactivity, *Canada.
Identifiers: *Saskatchewan water resources, The Water Resources Management Act, The Department of the Environment Act(Canada).

The Water Resources Management Act of 1972 and the Department of the Environment Act of 1972 are expected to become laws in Canada simultaneously. The latter act repeals the Water Resources Commission Act as amended. Pollution is defined as any change in the temperature, taste, or odor of Saskatchewan waters; the addition or removal of any liquid, solid, radioactive, gaseous, or other substance that will be harmful to the public health or that is unsafe for domestic, municipal, industrial, agricultural, recreational, or other lawful usage or that is detrimental to wildlife, birds, or aquatic life, or sewage containing animal, vegetable or mineral matter in suspension or solution, including rainwater resulting from melted snow or ice which has entered the sewage works. The Minister of the Environment is made responsible for administering the water resources of Saskatchewan and supervising all pollution matters. The Minister is also responsible for the general supervision, control, and regulation of all matters concerning waterworks, sewage, water quality, and its impairment. The municipality's medical health officer is to advise the Minister on matters of public health relating to water and sewage. (Leibowitz-FIRL)
W75-04323

QUALITY CONTROL IN RIVER MANAGEMENT OF THE BRISTOL AVON,
Bristol Avon River Authority (England).
G. S. N. Ingham.
Water Pollution Control, Vol 73, No 4, p 425-432, 1974.

Descriptors: *Water quality control, Management, *Water pollution control, *Industrial wastes, Waste water treatment, Rivers, Flow characteristics, Effluent control, Water reuse, Self-purification, *Quality control, Regulation.
Identifiers: *Bristol Avon River Authority(UK), Pollution Prevention Acts, Rivers Act(1961).

The River Avon and its tributaries receive 200 x 1000 cu m of sewage effluent, 335 x 1000 cu m of industrial waste water, and an unknown volume of effluent from about 4000 farms roughly estimated at 15 x 1000 cu m daily. The river system carries an estimated effluent load of 550 x 1000 cu m/d DWF. Quality control is required on a closely detailed scale, since each section of the river receives direct effluent, influencing the next downstream section, and being itself influenced by its adjoining upstream stretch. Quality control necessitates flow and quality data at or near the source of every river and tributary; flow and quality data at strategic points down the river or tributary to its confluence; flow and quality data of all important effluents discharged into each river; and, the locations and quantities of abstractions. From such data the following becomes available: maximum, minimum, mean and median for flow and quality parameters, and the standard deviation of all parameter values; effluent effects and their location; recovery rate; pollution load carried; maximum pollution load safety carriable; extent to which overloading occurs; extent to which effluent regulations are applicable; identification of lengths where there are unknown discharges; abstraction effects; extent of abstraction restrictions needed; and, the extent to which abstraction is possible. (Leibowitz-FIRL)
W75-04324

POLLUTION AND PUBLIC HEALTH: TACONITE CASE POSES MAJOR TEST,
L. J. Carter.
Science, Vol 186, No 4158, p 31-34, 36, October 4, 1974. 1 fig.

Descriptors: *Lake Superior, *Water pollution, *Public health, Mining, *Mine wastes, *Asbestos, Benthos, Potable water, Human diseases, Water supply, Industrial wastes, Municipal water.
Identifiers: *Taconite tailings, Cancer, Green water phenomenon.

Lake Superior has for the past 18 years been polluted by the wastes of the Reserve Mining Company. The Lake, which was once considered of such purity that Duluth, Minnesota, among other cities, used its water for drinking, is the largest body of freshwater on earth - 350 miles long, 160 miles across at its widest, and up to 1333 feet deep. The lake, however, is not large enough to assimilate the Reserve's discharge of taconite tailings; the discharge is fivefold greater than the 12,000 tons of solids estimated to enter naturally each day from the inflow of about 200 rivers and the erosion of miles of shoreline. The tailings have despoiled some 200 square miles of the west end of the lake. The tailings delta extends 4000 feet offshore from the discharge point, and is nearly a mile wide. The tailings have settled at the bottom over large areas, smothering benthic organisms and harming the ecology of the lake. The green water phenomenon occurs over many miles of the lake when large quantities of light-reflective tailings surface. Last year it was determined that tailing fibers indistinguishable from amphiobole asbestos fibers were present in Duluth drinking water. A high incidence of cancer occurs among persons exposed to asbestos in their jobs and in the environment, giving a federal suit against the Reserve new impetus. (Leibowitz-FIRL)
W75-04326

HYDRODYNAMIC EFFECTS OF OIL SLICK MECHANICAL CONTROL DEVICES,
Texas A and M Research Foundation, College Station.
L. A. Hale.
Available from the National Technical Information Service Springfield, Va. 22161 as AD-777 926, $4.75 paper copy, and $2.25 microfiche. Report No CG-D-64-74, February 1974. 84 p, 60 fig, 5 tab. DOT-CG-23357-A.

Descriptors: *Oil spills, *Model studies, *Laboratory tests, *Oil, Pollution, Hydraulic models, Energy dissipation, Theoretical analysis, Hydrodynamics, Flow, Mechanical control, Equipment, Velocity, Flumes, *Water pollution control.
Identifiers: *Oil slicks, Two-phase flow.

A section of a research program conducted by the U.S. Coast Guard was summarized. The objective was to investigate the behavior of an oil slick under the influence of various mechanical control devices. Four types of slick control mechanisms were investigated: (a) oil slick energy dissipation, (b) oil slick shields, (c) rapid removal of oil by lifting mechanisms, (d) oil slick submersion devices. The tests were conducted in a 150-foot tilting flume. Three test oils were used: (a) No. 2 diesel oil, (b) SAE 30 lubricating oil, (c) SAE 140 lubricating oil. The results showed that devices or systems using energy dissipation elements could capture and hold a significant volume of oil at current velocities significantly greater than those causing the failure of conventional containment barriers. Slick shield devices, operated as a secondary element of an energy dissipation system, served a valuable function in protecting a quiet oil pool from the direct action of a high velocity current. Surface penetrating blades appear to have merit only for smooth surface operations. If further testing is to be performed it is felt that the entire blade system should be moved relative to still water to minimize surface irregularity problems. Under high current situations, the flow near the surface of submersion devices was dominated by inertial effects so that the viscous effects, significant to the boundary layer phenomena associated with the moving surfaces, were negligable. No features of the flow of the slick under the influence of submersion devices were considered to be advantageous for the control of slicks under high current situations. (Humphreys-ISWS)
W75-04327

6. WATER RESOURCES PLANNING

6A. Techniques Of Planning

INTEGRATED SYSTEM IDENTIFICATION AND OPTIMIZATION FOR CONJUNCTIVE USE OF GROUND AND SURFACE WATER, PHASE II,
Case Western Reserve Univ., Cleveland, Ohio. Dept. of Systems Engineering.
For primary bibliographic entry see Field 4B.
W75-03853

METHODOLOGIES FOR OPERATING RESERVOIRS FOR SHORT-TERM FLOOD CONTROL,
Cornell Univ., Ithaca, N.Y. Dept. of Operations Research.
For primary bibliographic entry see Field 4A.
W75-03855

ELKHORN RIVER BASIN SCREENING MODEL, A REPORT TO THE MISSOURI RIVER BASIN COMMISSION,
Nebraska Univ., Lincoln. Water Resources Research Inst.
W. Viessman, Jr., G. L. Lewis, I. Yomtovian, and J. Envoldsen.
May 1974. 335 p, 94 fig, 146 tab, 9 ref, 5 append.

Descriptors: Surface water, Watersheds(Basins), *Water policy, *Multiple-purpose projects, *Linear programming, *Reservoirs, *Flood control, *Investment, *River basin commissions, *Model studies, Alternative planning, Optimization, Simulation analysis, Constraints, Evaluation, Management, Annual, Costs, Flood damage, Irrigation, Recreation, Storage, Equations, *Nebraska, Water resources development.
Identifiers: *Elkhorn River Subbasin(Neb), Screening models, Water uses, Sensitivity analysis, Cost minimization, Benefit maximization.

Investment and management decision making for basin-wide surface water systems is considered and a linear programming investment screening model is described. The general model consists of a set of constraints defining possible investment and operating policy alternatives and an objective function for evaluating these. Surface water uses in the Elkhorn River Subbasin include irrigation, recreation, fish and wildlife enhancement, and flood control. The Elkhorn Basin preliminary screening model is described in detail. For each site in the basin, a set of equations which represents average annual costs and benefits to be gained from various activities is formulated. Objectives used in evaluating alternatives include both cost minimization and benefit maximization. A constraint set assures inclusion of pertinent physical, institutional, or legal restrictions. The model structure for flood control is elaborated, and a flood-event simulation and routing model to be used extensively in conjunction with the optimization model is described. The model develops benefit functions and functional relationships between flood peaks and various reservoir capacities. A description and an analysis of model runs on seven watersheds in the Elkhorn River Subbasin are presented. Appendices give: list of variables; agency data for reservoirs and data for flood damage sites; screening model schematics; and optimization run tabulations. (Bell-Cornell)
W75-03921

EVALUATION OF INTERREGIONAL INPUT-OUTPUT MODELS FOR POTENTIAL USE IN THE MCCLELLAN-KERR ARKANSAS RIVER MULTIPLE PURPOSE PROJECT IMPACT STUDY,
Catholic Univ. of America, Washington, D.C. Inst. of Social and Behavioral Research.
For primary bibliographic entry see Field 4A.
W75-03923

DATA REDUCTION METHODS FOR HYDROLOGIC ANALYSES,
Los Angeles County Sanitation Districts, Whittier, Calif.
For primary bibliographic entry see Field 7C.
W75-03929

DESIGN OF A CONDUIT SYSTEM WITH DIVERGING BRANCHES,
North Carolina State Univ., Raleigh. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 8A.
W75-03930

EVALUATING MULTIRESERVOIR OPERATING RULES,
Ecole Polytechnique, Montreal (Quebec).
For primary bibliographic entry see Field 4A.
W75-03932

APPRAISAL OF IRRIGATION PROJECTS AND RELATED POLICIES AND INVESTMENTS,
Ministry of the Presidency, Mexico City.
For primary bibliographic entry see Field 3F.
W75-03933

CHANCE-CONSTRAINED DYNAMIC PROGRAMING AND THE OPTIMIZATION OF WATER RESOURCE SYSTEMS,
New South Wales Univ., Kensington (Australia).
For primary bibliographic entry see Field 4A.
W75-03934

OPTIMIZATION OF REAL TIME OPERATION OF A MULTIPLE-RESERVOIR SYSTEM,
California Univ., Los Angeles. Dept. of Engineering Systems.
For primary bibliographic entry see Field 4A.
W75-03935

APPLICATION OF ANALOG TECHNIQUES TO WATER MANAGEMENT,
Nevada Univ., Reno. Desert Research Inst.
H. A. Shamberger, and P. A. Domenico.
Presented at A.S.C.E. Fourteenth Hydraulics Division Conference, August, 25, 1965, University of Arizona, Tucson, p 1-22, 12 fig.

Descriptors: *Ground water availability, *Water management, *Analog models, *Aquifer management, *Ground water, *Artesian aquifers, *Nevada, Model studies, Computer models, Resistance networks, Aquifers, Aquifer systems, Water sources, Water yield, Permeability, Porosity, Water supply, Water demand, Water resources, Water resources development, Water table, Subsurface waters, Water wells, Ground water resources, Watersheds(Basins), Urbanization.
Identifiers: *Electric analog models, *Las Vegas Valley(Nevada), Ground water development, Lake Mead(Nevada), Physical analog.

Effects of vague natural phenomenon can be measured through use of systems which are of similar but more predictable performance. In Las Vegas Valley, Nevada, rapidly declining water pressure levels are of concern. Ground water reservoir depletion has been tolerated because it was hoped that Lake Mead would provide a large portion of the water supply. An electrical analog of the Valley applies the time-variant or transient flow of ground water as simulated by the time varying flow of electrical current. The resistance of the model changes the potential of the flow as the aquifer permeability reduces the potential of moving fluid; voltage and current become analogous, to head and flow of water. By measuring these voltages and currents, the aquifer's response to pumping can be determined. Factors revealed in the study include: (1) acceleration of ground water production will not result in excess development of the Valley; (2) if surface water is imported, pumping facilities can be developed; and (3) local problems with shallow domestic wells may arise before importation facilities are completed. The analog is being used to aid ground water management in the state. (Grden-North Carolina)
W75-04202

MORE RESPONSIVE WATER PLANNING IS POSSIBLE,
Washington State Univ., Pullman. R. L. Albrook Hydraulic Lab.
H. D. Copp.
Prepared for Washington State Department of Ecology through the State of Washington Water Research Center. Engineering Extension Service, Pullman, Washington, Bulletin 330, March 1973. 81 p, 6 fig, 12 tab, 37 ref, 3 append.

Descriptors: *Water resources, *Washington, *Water policy, *Planning, Water resources development, Regional development, Water allocation(Policy), Legislation.
Identifiers: SOLAR(Store Abstracts and Provide On Line Automatic Retrieval), *Water Resources Act of 1971(Washington), *Public participation.

After three years of inquiry efforts and study of water planning and management activities in Washington, the success was assessed of present policy and procedures, along with the possibility of improvement through new methodologies. Assuming that failure of past water resource planning stemmed from the public not being given appropriate opportunity to participate in planning and decision-making, a planning process to be implemented by planners in response to public demand is outlined. In-accessibility to information creates a hindrance to water resource planning which can be eliminated by the establishment of a water resource archive patterned after a similar retrieval system such as SOLAR (Store Abstracts and Provide On Line Automatic Retrieval). Preplanning organizational effort allows for responsible decision-making. The planner formulates alternatives representing public preference and attempts to implement changes through control and guidance. Innovative and flexible planning procedures include: (1) objectives and techniques for public participation, (2) implementation of public involvement programs, (3) definition of planning areas, (4) organization of local sponsoring groups to conduct information programs, (5) initiation of public needs, (6) selection of a local contact group (7 to 10 persons) to act as liaison, (7) creation of public workshops to serve as a forum, (8) a planning commitment to public involvement programs and (9) an awareness of political influence and ability to cope with it. Realizing planning has been costly, inefficient and excessive in overlap, Washington State enacted a Water Resources Act of 1971 which would provide framework for this prescribed program. (Salzman-North Carolina)
W75-04203

PLANNING FOR WATER QUALITY IN THE VIRGIN RIVER SYSTEM IN THE STATE OF UTAH: A PROGRAM FOR DEVELOPING A COMPREHENSIVE WATER QUALITY MANAGEMENT PLAN.
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 5G.
W75-04206

PLANNING FOR WATER QUALITY IN THE SEVIER RIVER SYSTEM IN THE STATE OF UTAH: A PROGRAM FOR DEVELOPING A COMPREHENSIVE WATER QUALITY MANAGEMENT PLAN.
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 5G.
W75-04207

APPLICATIONS OF SYSTEMS ANALYSIS TO INTERNATIONAL WATER RESOURCES PROJECTS,
California Univ., Davis. Dept. of Civil Engineering.
G. T. Orlob.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 227-237. 1 fig, 2 ref.

Descriptors: *Water resources, *Systems analysis, *Mathematical models, *Water quality, Simulation analysis, Optimization, Water management(Applied), Hydrology, Hydraulics, Urban hydrology, Monte Carlo Method, Foreign countries, Europe.
Identifiers: Risk theory, Poland(Vistula River), Germany(Hamburg), Romania(Mures and Arges River).

Examples of experience in developing and applying systems analysis in international water resources projects were reviewed and problems encountered were discussed. The present state of the art in Europe was described and some indicated trends were high lighted. Specific projects in Poland, West Germany, and Romania were discussed. (See also W75-04213) (Terstriep-ISWS)
W75-04232

ENHANCING WATER RESOURCE PLANNING EFFECTIVENESS: A SIMULATION GAMING APPROACH,
Stanford Univ., Calif.
J. M. Johnson, M. H. Whithed, and G. P. Johnson.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 238-248. 2 tab, 24 ref.

Descriptors: *Water resources, *Planning, *Simulation analysis, *Comprehensive planning, Multiple purpose, Multiple purpose projects, Optimization, Cultures.
Identifiers: Planning style, Simulation games, Cognitive information, Affective information, Nuerland, Validation approach.

The role of the planner and of multiple objective planning in the expanding technology of modern society was discussed. The orientation and attitudes associated with considerations of who benefits from a plan, whose objectives are included, and who participates in planning decisions were defined as major elements of planning style. The simulation game was explored as a technique for making major aspects of planning style more explicit. Both cognitive and affective information can be derived from the application of simulation games to planning. Both of these areas of information were discussed. (See also W75-04213) (Terstriep-ISWS)
W75-04233

SENSITIVITY ANALYSIS OF THE OPTIMUM DESIGN FLOOD EVALUATED BY AN OPTIMIZATION PROCEDURE,
Karlsruhe Univ. (West Germany). Theodor-Rehbock Lab. for River Improvement.
For primary bibliographic entry see Field 4A.
W75-04234

THE APPROXIMATE PROBABILITY DENSITY FUNCTION OF RANGE AND ADJUSTED RANGE,
National Energy Authority, Bangkok (Thailand).
P. Sutabutr.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 427-438. 3 fig, 2 tab, 10 ref.

Descriptors: *Markov processes, *Probability, *Statistics, Mathematics, Mathematical studies, Statistical Methods, Synthetic hydrology, Systems analysis.
Identifiers: *Approximate probability density function, Random processes.

The objectives were to develop the general expression approximately for probability density function and probability distribution function for the random variable range of both the independent random normal variable and dependent random normal variable of the first and second order Markov linear model. By using the four basic parameters (mean, variance, skew, and excess coefficients) obtained by generation and by applying the basic criteria set by Pearson, the approximate probability density function of range was obtained as one of the best fitted from his family of curves. The parameters of this probability density function can then be computed by using the exact and approximate expression for the expected value and variance of the maximum range of the independent normal variable or dependent normal variable of the first and second order Markov linear model derived previously by others. (See also W75-04213) (Jess-ISWS)
W75-04246

TOWARD A SCIENCE POLICY FOR COMPUTERS IN WATER RESOURCES: TRENDS AND ISSUES,
Illinois Univerity, Chicago. Dept. of Engineering.
G. Bugliarello, and F. J. Gunther.
In: Water for the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 277-283. 6 ref. OWRT X-113(No 3422)(1).

Descriptors: *Computers, *Water resources, *Systems analysis, Computer programs, Programming languages, Research equipment, Methodology, Technology, Management, Planning.

An overview is provided of the most critical issues that have emerged and are likely to emerge in the future as a result of the development of computer technology. Consideration of these issues should be fundamental to policy generation by both governmental agencies and users organizations. The following pivotal issues were discussed and recommendations for appropriate action made: (1) the establishment of computer utilities; (2) the introduction and diffusion of minicomputers; (3) the development of intimately connected computer-instrument packages; (4) the factors influencing the application of hybrid systems; (5) the upgrading of software engineering and management; (6) facilitation of the user's approach to the computer and modes of communication; (7) continued development of appropriate schemes for the analysis, planning, design, and operation of water resources systems; and (8) consideration of the establishment of master computer programs with compatible flexibility as a viable alternative to 'ad hoc' approaches to problem solution. (See also W75-04213) (Scott-ISWS)
W75-04257

THE MEASUREMENT OF IMPACTS IN SMALL WATERSHEDS FOR FLOOD CONTROL,
New South Wales Inst. of Technology, Kensington (Australia). Dept. of Economics.
For primary bibliographic entry see Field 4A.
W75-04341

RESERVOIR OPERATION THROUGH OBJECTIVE TRADE-OFFS,
Iowa Univ., Iowa City. Inst. of Hydraulic Research.
For primary bibliographic entry see Field 4A.
W75-04345

6B. Evaluation Process

SOME POLITICAL AND ECONOMIC ASPECTS OF MANAGING CALIFORNIA WATER DISTRICTS,
California Univ., Los Angeles. Inst. of Government and Public Affairs.
J. B. Jamieson, S. Sonenblum, W. Z. Hirsch, M. R. Goodall, and H. Jaffee.
Available from The Institute of Government and Public Affairs University of California, Los Angeles, 90024 as Report No 190 for $8.00; Also available from the National Technical Information Service, Springfield, Va 22161, as PB-239 147, $8.75 in paper copy, $2.25 in microfiche. Completion Report No 190, 1974. 291 p, 2 fig, 95 tab. OWRT C-3289(No 3714)(1).

Descriptors: *California, *Water districts, *Decision making, Management, *Cost-benefit analysis, *Water policy, Local governments.
Identifiers: *Voting.

A study was made of those special districts in California which promote, protect, and guide the administration of water resources. The history of water districts is explored with special attention paid to the districts' authorities and powers derived from statutes as well as court decisions. The performance of Local Agency Formation Commissions, as agencies that authorize and control water districts, is assessed. Leadership of district governing bodies is studies; socio-economic data about these leaders are presented as well as information concerning their tenure and motivations for serving. The decision-making process in water districts is examined and particular attention is given to the electroal process. The study also examines certain economic effects of water board decisions relating to water pricing, land assessment, and water delivery. As more districts were formed to meet urban water needs, they were formed under enabling acts that required property qualifications for voting and permitted weighted voting. This system of voting enables individuals with large land-holdings to control some districts. There is also evidence that this system of voting not only results in infrequent elections but also low voter turnout when elections are held. Also enormous subsidies accrue to large landowners under the special provisions of Reclamation Law.
W75-03856

ELKHORN RIVER BASIN SCREENING MODEL, A REPORT TO THE MISSOURI RIVER BASIN COMMISSION,
Nebraska Univ., Lincoln. Water Resources Research Inst.
For primary bibliographic entry see Field 6A.
W75-03921

CHANGING WATER USE IN SELECTED MANUFACTURING INDUSTRIES,
National Bureau of Economic Research, Washington, D.C.
R. A. Leone, J. R. Ginn, and A-L. Lin.
IWR Contract Report 74-10, U.S. Army Engineer Institute for Water Resources, Fort Belvoir, Va., October 1974. 152 p, 12 fig, 30 tab, 33 equ, 15 ref, append. DACW 31-72-C-0044.

Descriptors: *Industries, *Industrial water, *Water utilization, *Water costs, Technology, Decision making, *Water quality, Recirculated water, Transportation, Water demand, Data collections, Water policy, Methodology, Regression analysis, Estimating, Surveys, Cost analysis,

Least squares method, Equations, Mathematical models, Systems analysis, *Sites.
Identifiers: Manufacturing, Process design, Price elasticity, Trends, Urban water supply.

Empirical evidence regarding shifts in industrial water use is presented to provide greater understanding of the impact of changes in the cost and quality of water on technological changes in process design and plant location decisions. The ways in which water enters industrial processes are identified. An historical perspective on the scope and dynamics of water use in manufacturing is provided. Both industry and regional (including temporal) variations in water use and reuse in selected industries are examined to determine the extent to which water use technology has been changing. Next, the location decisions of water-using firms are examined. Considered are shifting employment patterns and the effects of water pollution controls. The a cross-section model of industry response to water costs is presented. Demand equations for gross water and intake water are specified and then estimated using cross-section plant data for the paper, chemical, petroleum, and steel industries. Results show a statistically significant relationship between water cost and water demand, with demand elasticities on the order of .5 to 1.0. Rising water costs are decreasing the importance of water for processing as a criterion for discriminating between location sites. (Bell-Cornell)
W75-03922

APPRAISAL OF IRRIGATION PROJECTS AND RELATED POLICIES AND INVESTMENTS,
Ministry of the Presidency, Mexico City.
For primary bibliographic entry see Field 3F.
W75-03933

PROTECTING CREEKSHEDS: DEVELOPMENT AND EVALUATION OF A METHOD TO MANAGE SMALL, URBANIZING WATERSHEDS THROUGH LOCAL GOVERNMENT ACTIONS,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03947

PROTECTING CREEKSHEDS, ANALYSIS AND ACTION,
Huron River Watershed Council, Ann Arbor, Mich.
For primary bibliographic entry see Field 4D.
W75-03948

SOME SOCIO-AGRICULTURAL CHANGES AS A RESULT OF INTRODUCTION OF IRRIGATION IN A DESERT REGION,
Central Arid Zone Research Inst., Jodhpur (India).
For primary bibliographic entry see Field 3F.
W75-03951

IS THE WATER SAFE TO DRINK. PART 3: WHAT YOU CAN DO,
Environmental Defense Fund, Washington, D.C. Water Resources Program.
For primary bibliographic entry see Field 5F.
W75-04019

WHITHER WATER.,
J. Gribbin.
Nature, Vol 250, No 5464, p 276-277, June, 1974. 1 fig, 2 tab.

Descriptors: *Water resources development, *Water supply development, *Comprehensive planning, Groundwater resources, Legislation, Water supply, Projections, Water resources, Desalination.
Identifiers: *United Kingdom.

The future plans for water resources in Britain are discussed. River management, water supply, and sewage disposal are under the control of new regional water authorities. A Central Water Planning Unit assists with the issues on a national basis, at the government level and at the regional level. The possibility that a new weather pattern is developing is also discussed. Proposals for climatic research are under consideration. The CWPU would like to develop a 'national water grid' involving transfers from region to region and the extension of the present system of river regulation. There are plans to develop groundwater abstraction. Desalination is also being considered but does not appear to be feasible. (Orr-FIRL)
W75-04025

THE DEVELOPMENT OF SUPPLEMENTAL WATER: RESOURCE FLEXIBILITY AND FARM MANAGEMENT OPTIONS,
Utah State Univ., Logan. Dept. of Economics.
For primary bibliographic entry see Field 3F.
W75-04031

MANAGEMENT OF WATER RESOURCES FOR URBAN ENVIRONMENTAL ENHANCEMENT,
Environments for Tomorrow, Inc., McLean, Va.
M. Wendell, and H. O. Banks.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 301, $8.75 in paper copy, $2.25 in microfiche. Completion Report, July 1974. 273 p, 14 fig, 11 tab, 142 ref. OWRT C-3012(No 3672)(1).

Descriptors: Water resources development, Planning, Environment, Ecology, Recreational facilities, Attitudes, *Management, *Urban sociology, *City planning, *Urbanization, *Benefits, Water utilization, Legal aspects, Human population, *Community development.
Identifiers: *Urban environmental enhancement, Water-oriented amenities, Governmental structure, Community attitudes.

Natural and man-made water bodies and facilities are resources that can be managed to enhance urban environments. While such water-oriented amenities may be more desirable in sparsely populated areas, recreation and esthetic enjoyment can be provided in most places. Such urban water management may provide social benefits including diminution of tensions and better balanced communities. Specific metropolitan areas were studied including Harrisburg, Pennsylvania; Waterloo, Iowa; Houston, San Antonio, and Flower Mound, Texas; Sacramento, California; Minneapolis-St. Paul, Minnesota; and Columbia, Maryland. These studies show how different areas have approached or neglected the use of water for urban enhancement. Governmental structure, community attitudes, and the water resources available are important factors. Federal, state, and local governments all have responsibilities in water management for environmental improvement. Recommendations are presented in general terms and in relation to the several case studies.
W75-04151

PLANNED REUSE OF POLLUTED WATERS AND WASTEWATERS,
North Carolina Univ., Chapel Hill.
For primary bibliographic entry see Field 5D.
W75-04198

APPLICATION OF ANALOG TECHNIQUES TO WATER MANAGEMENT,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 6A.
W75-04202

THE NEXT TEN YEARS: SOME RECOMMENDATIONS TO THE DELAWARE RIVER BASIN COMMISSION,
Pennsylvania Univ. Philadelphia. Inst. for Environmental Studies.
A. L. Strong, J. C. Keene, and J. Hillsberg.
April, 1971. 23 p.

Descriptors: *Water management, *Delaware River Basin Commission, *Interstate commissions, *River basin commission, *Water pollution, Abatement, Delaware, Delaware River, Maryland, New York, New Jersey, River basins, Water resources, Water pollution treatment, Water pollution sources, Water pollution effects, Water policy, Water demand, Water supply, Watershed management, Water quality standards, Water resources development, Comprehensive planning.
Identifiers: Citizen's Advisory Committee.

In its first ten years, the Delaware River Basin Commission (DRBC) implemented a pollution abatement and regulation program. Now DRBC must consider long-range needs; recommendations for improving programs and procedures are specified. DRBC should place high priority on protecting flood plains and other wetlands; and proposals to preserve and enhance water-related natural, historic, and scenic areas; and incorporate policies allocating water for use, consumption, and waste assimilation. It is also recommended that DRBC seek more grants and appropriations from the federal government and the 4 states, use its power to charge for its services although a study or risks and benefits involved by various possible charges is suggested prior to initiation, and change tax laws to better serve objectives. To enforce water quality standards, waste discharges should be monitored by DRBC and should bear the monitoring costs. The Commission should also create an ombudsman position, provide more public interest protection in advance of hearings, and strengthen the role of technically-qualified persons at hearings. Changes recommended in organizational structure include appointment of full-time commissioners, development of a Citizen's Advisory Committee, and establishment of a deputy director. (Grden-North Carolina)
W75-04210

COOLING TOWERS - BEST ACHIEVABLE THERMAL POLLUTION ABATEMENT TECHNOLOGY,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
For primary bibliographic entry see Field 5D.
W75-04223

THERMAL POLLUTION OF THE GREAT LAKES -- A NON-PROBLEM,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 5B.
W75-04231

ENHANCING WATER RESOURCE PLANNING EFFECTIVENESS: A SIMULATION GAMING APPROACH,
Stanford Univ., Calif.
For primary bibliographic entry see Field 6A.
W75-04233

A POSITIVE LOOK AT ACHIEVEMENTS IN WATER QUALITY ENHANCEMENT,
Howard, Needles, Tammen, and Bergendoff, Alexandria, Va. Dept. of Environmental Quality and Conservation.
For primary bibliographic entry see Field 5G.
W75-04247

THE ELEMENTS OF CARRYING CAPACITY IN THE RECREATION UTILIZATION OF RESERVOIRS,
Bureau of Reclamation, Denver, Colo. Lower Missouri Region.

R. A. Crysdale.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 459-471. 35 ref.

Descriptors: *Recreation, *Recreation demand, *Reservoirs, Social needs, Economics, Use rates, Psychological aspects, Water skiing, Fishing, Boating, Recreation facilities, Administration.

The literature generated by universities, governmental agencies, professional organizations, and water sport experts provides a cross section of specialized disciplinary viewpoints on the concept of recreation carrying capacity of water bodies. Administrative, biological, physical, social, and temporal elements interacting with each other influence the degree reservoirs are utilized for various water recreation activities. An understanding of each element and its relationships to the other elements provides recreation planners, developers, and managers insight to the inherent and dynamic complexity of carrying capacity of reservoirs. However, the recreation carrying capacity of water resources is an artificial concept. It is also the only concept available and, therefore, must be used with caution for water resources planning, development, and management. (See also W75-04213) (Gibb-ISWS)
W75-04249

A MODEL STUDY FOR THE PROJECTED INCREASE IN WATER USE IN KANE COUNTY, ILLINOIS, U.S.A.,
Northeastern Illinois University, Chicago, Illinois.
K. O. Thomsen, and M. Y. Qutub.
In: Water for the Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 377-387. 8 fig, 2 ref.

Descriptors: *Water resources development, *Hydrogeology, *Model studies, *Illinois, Groundwater resources, Groundwater, Water demand, Planning, Management, City planning, Recharge.
Identifiers: Kane County(Ill).

Kane County is located in northeastern Illinois, 60 miles west of Chicago. Currently, the county is on the edge of Chicago's outward urban expansion, with three major developments in the planning stages, including two new towns. Kane County primarily relies on groundwater resources. The projected increase in population, industry, and commerce will increase the demand for water. This will require better water resources management. A projected model for future water use was discussed. (See also W75-04213) (Scott-ISWS)
W75-04258

THE MEASUREMENT OF IMPACTS IN SMALL WATERSHEDS FOR FLOOD CONTROL,
New South Wales Inst. of Technology, Kensington (Australia). Dept. of Economics.
For primary bibliographic entry see Field 4A.
W75-04341

RESERVOIR OPERATION THROUGH OBJECTIVE TRADE-OFFS,
Iowa Univ., Iowa City. Inst. of Hydraulic Research.
For primary bibliographic entry see Field 4A.
W75-04345

6C. Cost Allocation, Cost Sharing, Pricing/Repayment

CHANGING WATER USE IN SELECTED MANUFACTURING INDUSTRIES,
National Bureau of Economic Research, Washington, D.C.
For primary bibliographic entry see Field 6B.
W75-03922

PRICING IRRIGATION WATER IN IRAN,
Utah State Univ., Logan. Dept. of Economics.
For primary bibliographic entry see Field 3F.
W75-03936

CRITERIA FOR REGIONALIZATION OF WATER AND WASTE MANAGEMENT SYSTEMS,
Pennsylvania State Univ., University Park. Dept. of Economics.
For primary bibliographic entry see Field 5D.
W75-03946

ECONOMIC ANALYSIS OF LAND TREATMENT OF MUNICIPAL WASTEWATERS,
North Carolina State Univ., Raleigh. Dept. of Economics.
For primary bibliographic entry see Field 5D.
W75-04047

PHOSPHORUS DETERGENT BAN-HOW EFFECTIVE,
Pieczonka Consultants, Lackawanna, N.Y.
For primary bibliographic entry see Field 5D.
W75-04109

PHILADELPHIA PILOTS--BUILDS OXYGEN ACTIVATED SLUDGE,
Philadelphia Water Dept., Pa.
For primary bibliographic entry see Field 5D.
W75-04115

HOW CHICAGO MANAGES ITS DISTRIBUTION SYSTEM,
Chicago Dept. of Water and Sewers, Ill.
J. D. Starr.
Journal of the American Water Works Association, Vol 66, No 6, p 328-331, June, 1974.

Descriptors: *Water management, *Water policy, *Water distribution, *Water delivery, *Water works, Illinois, Water demand, Water supply, Water requirements, Water utilization, Water supply development, Water costs, Water users, Water control, Municipal water, Beneficial use, Water quality.
Identifiers: *Chicago(Illinois), *Department of Water and Sewers, *Bureau of Water, *Water Distribution Division, Bureau of Sewers, Water use, Water system.

The operations and capital improvements programs of the Chicago Department of Water and Sewers are supported by the water fund which must be completely self-supporting--receiving no tax monies of any kind. Revenue is derived from water charges and funds borrowed through the sale of water bonds. The Department is divided into the Bureau of Water and the Bureau of Sewers. One of the five divisions of the Water Bureau, the Water Distribution Division, having the most employees and the largest budget is discussed. It has five sections: (1) administrative which coordinates preparation of annual budget, develops specifications for pipe and appurtenances and maintains a 365 day-a-year complaint-and-information center; (2) engineering which continually plans for current requirements and future needs. Sound-level metering devices are used to detect leaks keeping water loss to a minimum; (3) plumbing inspection where all new and remodeling work performed by contractors is checked ro compliance with plumbing code. Continual house-to-house inspection of non-metered properties to detect leaks is carried on; (4) district field sections which perform construction and maintenance with strong emphasis on safe work practices; (5) machinery; (6) garage; (7) inventory and controls; and (8) tapping. A Students-as-Trainees and a job rotation program for newly employed engineers have been effective in increasing efficient operation. Even though the Department of Water and Sewers is operating under strict financial controls, the water system effectively furnishes water to the community at a cost ranking among the lowest of any metropolitan area in the country, costing about 6 1/2 cents per ton in Chicago. (Grden-North Carolina)
W75-04197

ATTITUDES TOWARD PAYMENT FOR RESOURCE USE: THE CASE OF DOMESTIC WATER CONSUMPTION,
Haifa Univ. (Israel).
C. S. Kamen, and P. Darr (Dalinsky).
Journal of Environmental Systems, Vol 4, No 1, Spring, 1974. p 1-21, 1 fig, 9 tab, 20 ref.

Descriptors: *Behavior, *Psychological aspects, *Domestic water, *Domestic use, *Water consumption, Water utilization, Potable water, Water quality.
Identifiers: Israel.

The interrelationships among socio-economic variables, attitudes and domestic water consumption are examined for a sample of 1,892 Israeli urban households. In Israel, the increased demand for domestic water is accompanied by quality deterioration due to pollution of water sources and possible expense of large-scale desalination of sea water. The analysis focuses on willingness to pay more for household water under various conditions, in an attempt to identify factors affecting individual readiness to pay for use of natural resources. The findings dealt with reported water use, limitation of use due to price, willingness to pay more for water, attitudes toward water quality, perception of water as commodity, effects of different systems of charges and relationship between social-psychological variable and measured consumption. Analysis reveals that willingness to pay depends both on the price demanded and on the purpose of the payment, that the equitability of the system of charges has an effect on willingness to pay, and that particular charge systems are not necessarily effective in attaining their intended ends. Although no relationship is found between attitudes toward water use and actual consumption, the analysis shows that social-psychological variables are important in determining individual readiness to undertake additional expenses which must be incurred as part of efforts to maintain environmental quality. (Salzman-North Carolina)
W75-04201

COST OF IMPORTING DEEP SANDSTONE WATER TO ELIMINATE GROUNDWATER DEFICITS IN NORTHEASTERN ILLINOIS,
Illinois State Water Survey, Urbana.
D. W. Beaver.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-239 300, $3.25 in paper copy, $2.25 in microfiche. Circular 120, 1974. 17 p, 4 fig, 8 tab, 5 ref.

Descriptors: *Costs, *Groundwater, *Economics, *Water resources development, Decision making, Water costs, Pipelines, Unit costs, Aquifers, Water supply, Water supply development, Groundwater resources, Water treatment, *Illinois, *Water importing, *Water transfer.
Identifiers: Kane County(Ill), McHenry County(Ill), Lake County(Ill), Du Page County(Ill), Cook County(Ill), Will County(Ill), Townships.

The cost of importing groundwater to eliminate projected deficits was estimated for deficient townships within the 6-county area of northeastern Illinois. The sole source of imported water was assumed to be deep sandstone water from neighboring townships. The total cost of water at a given deficient township consisted of the raw water cost and the treatment cost. The raw water cost consisted of the cost of locally produced raw water and the cost of imported raw water needed to satisfy the deficit. The cost of imported raw water consisted of the production cost at the source township and the transmission cost to bring the water to the deficient township. Transmission costs were calculated from published data and formulas assuming that the water was transmitted along portions of an idealized network based on the existing system of highways, streets, and railways. The total deficit at a given township was assumed to be met with water imported from a single source township. The least expensive source of water for importation was determined separately for each deficient township. The total cost of production and transmission was charged to the deficient township. Treatment of imported raw water was assumed to take place at the deficient township. The treatment cost was found to be the most significant cost component, accounting for nearly 60% of the total cost. The transmission cost was a relatively small cost component, accounting for 10 to 18% of the raw water cost and only 4 to 8% of the total cost. It was concluded that the groundwater resources available in northeastern Illinois should be adequate to meet the demands of the area until 2020, if mining of water from the deep sandstone aquifers is continued. (Humphreys-ISWS)
W75-04305

6D. Water Demand

USE OF WATER IN GEORGIA, 1970, WITH PROJECTIONS TO 1990,
Geological Survey, Atlanta, Ga.
R. F. Carter, and A. M. F. Johnson.
Georgia Water Resources Survey, Earth and Water Division Hydrologic Report 2, 1974. 74p, 9 fig, 7 tab, 20 ref.

Descriptors: *Water resources, *Water utilization, *Water uses, *Water demand, *Georgia, Data collections, Hydrologic data, Groundwater, Surface waters, Water supply, Water yield, Forecasting, Projections, Municipal water, Industrial water, Domestic water, Livestock, Cooling water.

Estimates of water use in Georgia in 1970 indicate that an average of about 5,560 mgd (21.0 cu hm/d) was withdrawn for four principal off-channel uses, which are (1) public supply (for domestic, commercial, and industrial uses), (2) rural (domestic, livestock, and irrigation), (3) self-supplied industrial, and (4) thermoelectric power. The fifth principal withdrawal use, hydroelectric power (an in-channel use), amounted to about 52,000 mgd (197 cu hm/d). In computing total withdrawals, recirculation (reuse) by a user is not counted, but withdrawal of the same water (cumulative withdrawal) by a downstream user is counted. Estimates of water withdrawal from the principal sources for off-channel use include 690 mgd (2.61 cu hm/d) from groundwater and 4,870 mgd (18.4 cu hm/d) from surface water. Consumptive use of water is projected to increase by slightly more than 100% by 1990, the increase being from 318 mgd (1.20 cu hm/d) to 760 mgd (2.88 cu hm/d). A large part of the increase will be due to evaporation from cooling towers of thermoelectric plants. (Woodard-USGS)
W75-03983

WATER RESOURCES EVALUATION OF THE SOUTHERN HIGH PLAINS OF NEW MEXICO,
New Mexico State Univ., University Park. Dept. of Agricultural Economics.
For primary bibliographic entry see Field 4B.
W75-04042

HOW CHICAGO MANAGES ITS DISTRIBUTION SYSTEM,
Chicago Dept. of Water and Sewers, Ill.
For primary bibliographic entry see Field 6C.
W75-04197

THE ELEMENTS OF CARRYING CAPACITY IN THE RECREATION UTILIZATION OF RESERVOIRS,
Bureau of Reclamation, Denver, Colo. Lower Missouri Region.
For primary bibliographic entry see Field 6B.
W75-04249

6E. Water Law and Institutions

INSTITUTIONAL FRAGMENTATION AND POLICY INNOVATION: THE CASE OF FEDERAL WATER POLLUTION CONTROL,
Arizona Univ., Tucson. Inst. of Government.
For primary bibliographic entry see Field 5G.
W75-03851

SOME POLITICAL AND ECONOMIC ASPECTS OF MANAGING CALIFORNIA WATER DISTRICTS,
California Univ., Los Angeles. Inst. of Government and Public Affairs.
For primary bibliographic entry see Field 6B.
W75-03856

UNITED STATES V. REPUBLIC STEEL CORPORATION (PROSECUTION FOR UNLAWFUL DISCHARGE OF COAL TAR INTO A RIVER).
For primary bibliographic entry see Field 5G.
W75-03992

UNITED STATES V. 21.54 ACRES OF LAND, MARSHALL COUNTY, WEST VIRGINIA (CONDEMNATION CASE FOR FLOWAGE EASEMENTS NEAR DAM SITE).
491 F 2d 301 (4th Cir W Va 1973).

Descriptors: United States, *Condemnation, *Easements, *Eminent domain, *High water mark, Legal aspects, Jurisdiction, Compensation, Navigable waters, Boundaries(Property), Dams, Contours, Elevation, Ohio River, Water level, Property values, Floods, Federal jurisdiction, Judicial decisions, Adjudication procedure, Dam construction, Flooding, Depreciation, *West Virginia.
Identifiers: *Inverse condemnation, Dam effects.

Appellee United States acquired flowage easements through condemnation for a dam project. An issue arose over the accuracy of the declaration for the extent of taking. Appellant landowners contended that appellee erred in determining the location of the ordinary high water mark on fish creek. This would have meant that the extent of the taking was in error and that the landowners would have to be compensated for the land located between the ordinary high water mark and the highest elevation of the land to be acquired. The trial judge refused to determine the location of the high water mark on the grounds that he did not have jurisdiction to do so. The appellate court decided that the trial judge had erred and did have jurisdiction to find as fact the actual location of the ordinary high water mark. This failure of the trial judge resulted in possible prejudice to the landowners the court stated. Thereupon the decision of the trial court was vacated and the case remanded with instructions to the United States District Court. (Chennault-Florida)
W75-03993

WINEMAN V. SHANNON BROTHERS LUMBER CO., INC. (ACTION BETWEEN COTERMINOUS RIPARIAN LANDOWNERS TO DETERMINE ACCRETION APPORTIONMENT).
368 F Supp 652 (N D Miss 1973).

Descriptors: *Mississippi, *Judicial decisions, *Accretion(Legal aspects), *Equitable apportionment, *Boundary disputes, Legal aspects, Water law, Boundaries(Property), Federal jurisdiction, Land tenure, Real property, Shores, Thalweg, Adjacent landowners, Adverse possession, Common law, Equity, Riparian land, Mississippi River, Adjudication procedure.
Identifiers: Liability(Legal aspects).

This suit is between coterminous riparian landowners to determine the apportionment of accretions. The plaintiffs also sought damages for the wrongful cutting of timber by the defendant corporation on the disputed portion of the accretions. The plaintiffs contended that the accretions should have been apportioned according to the thalweg or right angle rule. The defendant argued that the accretions should have been divided by extending the boundary between the two properties which had been established in a similar apportionment suit in 1919. In addition, the defendant contended that this extended boundary had been recognized as the dividing line between the properties by the parties and their predecessors in title under such circumstances as to have given the defendant superior title to the disputed accretions by reason of adverse possession. Finding that the evidence failed to establish adverse possession, the Federal District Court held that the thalweg or right angle rule applied in the instant case established the same diversion as the application of the general rule of apportionment and resulted in the more equitable diversion of the accretion. The court awarded the plaintiffs compensatory damages for the cut timber, but finding that the defendant acted in good faith, declined to impose any statutory penalty. (Deckert-Florida)
W75-03994

THE EMERGING RIGHT OF PHYSICAL ENFORCEMENT OF FISHERIES MEASURES BEYOND TERRITORIAL LIMITS,
Wisconsin Univ., Madison. School of Law.
R. B. Bilder.
University of Wisconsin Sea Grant College Program, Technical Report No 222, July 1974. 28 p, 24 ref.

Descriptors: *Law of the sea, *International law, *Fisheries, *Regulation, *Jurisdiction, Commercial fishing, Conservation, Fish management, Fish harvest, Boundary disputes(Legal aspects), Legal aspects, Adoption of practices, Governments, Oceans, Natural resources, Fisheries, Law enforcement, Marine fisheries.
Identifiers: Coastal waters, Contiguous zone, Territorial seas(Jurisdiction), International agreements, Territorial waters.

It is fairly likely that the Caracas Law of the Sea Conference will couple agreement on a fairly narrow territorial sea, probably twelve miles, with recognition of the rights of coastal states to regulate fishing in adjacent areas. The emergence of a regime of extensive coastal state fisheries jurisdiction has been presaged by the general trend toward establishment of broader fishery limits during the past several decades. A number of coastal states have made it clear that they will press vigorously for very broad coastal state regulatory authority over adjacent fisheries, ranging in some proposals out to two hundred miles. Some proposals appear virtually equivalent to an extended territorial sea. Others would establish an exclusive fishery zone. Others would grant the coastal states limited regulatory or managerial powers for special conservation and other purposes. Whatever form is followed, it is likely that traditional concepts of freedom to fish on the high seas will be significantly changed. (Sperling-Florida)

W75-03995

UNITED STATES V. KENNEBEC LOG DRIVING CO. ET AL. (SUIT BY GOVERNMENT TO ENJOIN LOG-DRIVING ACTIVITIES ON UPPER KENNEBEC RIVER).
491 F 2d 562 (1st Cir Maine 1973).

Descriptors: United States, *Navigable waters, *Rivers and Harbors Act, *Water pollution, *Maine. Lumbering, Wastes, Federal Water Pollution Control Act, Navigation, Channels, Legislation, Permits, Downstream, Rivers, Regulation, Watercourses, Environment, Environmental effects, Water pollution control, Waste disposal, Water resources, Water pollution sources, Water pollution effects, Water management(Applied).
Identifiers: *Refuse Act of 1899, *Navigation obstructions, Kennebec River(ME).

Appellant, United States, brought suit under the Rivers and Harbors Act of 1899 to enjoin the log driving by appellee, company, on the Kennebec River. Appellant claimed these activities violated sections 10 and 13 of the Act which respectively prohibited obstructing navigation and depositing refuse in navigable waters of the United States. On cross motions as to summary Judgment, the lower court found that the Act created an exception from the applicable sections for logging booms on rivers where log driving is the principal form of navigation. The log driving activities of the company were legal despite the lack of a permit. The motion of the government was denied and that of appellees granted. The government appealed. The court of appeals held that the sections of the Rivers and Harbors Act pertaining to obstruction of navigable waters did not apply to log driving on Kennebec River but that the section relating to deposit of refuse did apply. The judgement of the district court was vacated and the case remanded for further consideration. (Chennault-Florida)
W75-03996

KELSO V. C.B.K. AGRONOMICS, INC. (ACTION BY UPSTREAM LANDOWNERS FOR DAMAGES DUE TO CONSTRUCTION OF CONCRETE STRUCTURE ACROSS RIVER BY DOWNSTREAM OWNERS).
510 SW 2d 709 (Mo Ct App 1974).

Descriptors: *Missouri, *Judicial decisions, *Flood damage, *Watercourses, *Bridge construction, Bridges, Dams, Rivers, Legal aspects, Negligence, Floods, Riparian land, Natural flow, Construction, Water law, Adjudication procedure.
Identifiers: *Liability(Legal aspects), Proximate causation, Dam effects.

Owners of upstream real estate brought an action for damages to their farm and real estate caused by the construction of a concrete structure utilized by defendant as a bridge across the river. The defendant's bridge was located one mile downstream from the plaintiff. The structure rose about nine feet from the river bed, and it had four forty-eight inch tubes through it. The Missouri Court of Appeals held that because the structure acted like a dam the case was submissible to the jury on the theory of negligence and proximate cause of damage to the plaintiff's property by reason of longer periods of flooding. Where a permanent structure in a natural watercourse causes only transient damage or injury dependent upon the season and the terrain affected, the upstream owner might be entitled to prospective damages in addition to those accured, providing proof is present that the damage is certain to recur. (Sperling-Florida)
W75-03997

NATIONAL DRINKING WATER STANDARDS.
For primary bibliographic entry see Field 5G.
W75-03998

CUTBACK IN COSTRUCTION FUNDING STIRS DOUBT ON WATER QUALITY GOALS.
For primary bibliographic entry see Field 5G.
W75-03999

REGIONAL MANAGEMENT OF WASTE SYSTEMS,
Maryland Environmental Service, Annapolis.
For primary bibliographic entry see Field 5D.
W75-04000

THE PHILOSOPHY OF S.2770,
Senate, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-04001

LEGAL CONSIDERATIONS OF EGYPTIAN RESTRICTION OF FREE PASSAGE IN THE STRAITS OF TIRAN AND THE GULF OF AQABA,
North Carolina State Univ., Raleigh. Sea Grant Program.
J. E. Slate, Jr.
In: Current Aspects of Sea Law, Sea Grant Publication UNC-SG-74-03, p 50-56, March 1974. 35 ref.

Descriptors: *International waters, *Internal waters(Jurisdiction), *International law, *Waterways, Straits, Gulfs, Bays, Channels, Shoreline, Navigable waters, Legal aspects, Law of the sea, United Nations, Harbor, Ocean, Coasts, Shores.
Identifiers: Territorial seas(Jurisdiction), *Territorial waters, Littoral states, Waters.

Egypt advanced the argument that the Strait of Tiran and Gulf of Aqaba are not international waters. The Strait of Tiran is the entrance to the Gulf of Aqaba, and the sole non-Mediterranean access to the high seas for Israel. Egypt, Saudi Arabia, Jordan, and Israel are littoral states on the Gulf. However, the one navigable channel into the Gulf forms part of the territorial waters of Egypt. On this basis Egypt has closed these waters to Israeli shipping. Egypt refuses to accept that Israel is a littoral state on the Gulf and claims Israel occupies the littoral position by virtue of armed aggression. The waters of the Gulf of Aqaba are historically the territorial waters of its littoral states and Israel is not an historic littoral state. Egypt further argues that the Arab States consider themselves at war with Israel and this entitles them to exercise belligerency rights. Finally, Egypt asserts that the Strait of Tiran does not join two portions of the high seas, or two international waters, and therefore is not an international waterway. (Chennault-Florida)
W75-04002

LEMMONS V. UNITED STATES (ACTION FOR DAMAGES FOR REVOCATION OF DREDGE PERMIT).
496 F 2d 864 (Ct Cl 1974).

Descriptors: *Ohio River, *Judicial decisions, *Mineral industry, *Leases, Sands, Gravels, Dredging, Excavating, Mining, Industries, Industrial production, Legal aspects, Navigable waters, Water demand, Water law, Water resources development, Industrial plants, Economic aspects, Rivers, Federal government, Contracts, Contract administration, Permits.
Identifiers: Licenses, Navigation obstructions.

Action was brought by the lessee under a sand and gravel lease to recover damages in the form of just compensation for the alleged taking of sand and gravel tipple and for the value of the leasehold interest. Plaintiff, a sand and gravel company, received a permit from the Army Corps of Engineers to allow sand and gravel dredging operations in the Ohio River. This permit was later revoked in an effort to improve river navigation. Plaintiff did not remove the tipple following the revocation of the permit. The plaintiff asserted that the tipple was annexed to the leasehold and must be considered a part of the realty. The court of claims held that the tipple did not constitute real property. Since the lessee indicated an intent to abandon the tipple, the lessee could not recover its value. The court held that the parties considered the lease as terminated. There was, therfore, no leasehold interest in existence which could be the subject of an illegal taking. (Proctor-Florida)
W75-04003

MARINE CONSERVATION COMMISSION (AS AMENDED).
Mississippi General Acts, No 10, Ch 572, H.B. No 1243, p 19-30, approved April 23, 1974 (1974).

Descriptors: *Mississippi, Legislation, *Jurisdiction, *Oysters, *Shellfish farming, Regulation, Commercial shellfish, Adoption of practices, State governments, Economic aspects, Decision making, Administrative agencies, Fishing, Administration, Commercial fishing, Shellfish, Administrative decisions, Water resources development, Enforcement.
Identifiers: Administrative regulations, State policy, Coastal zone management.

Any shells of marine organisms which are under or upon the tidewaters within the territorial jurisdiction of the state of Mississippi are the property of the state and under the jurisdiction of the Mississippi Marine Conservation Commission. The commission is to manage, control, supervise, and direct any matters pertaining to marine life not otherwise delegated to another agency. The commission will open, close and regulate fishing seasons for the taking of shrimp, oysters, fish taken for commercial purposes and crabs. With a permit issued by the Mississippi Marine Resources Council, the commission is authorized to support projects in the nature of digging or constructing canals in order to bring additional water to existing oyster reefs or beds, or to establish new reefs or beds. Fifty percent of all the oyster shells produced from the oysters processed within the state are declared to be the nontransferable property of Mississippi. Anyone taking oysters from the public reefs will deliver to the commission fifty percent of the shells, or the commission can, at its option, set reasonable compensation. (Sperling-Florida)
W75-04004

UNITED STATES V. HOLLAND (ACTION TO ENJOIN UNLAWFUL FILLING OPERATIONS).
373 F Supp 665 (MD Fla 1974).

Descriptors: *Judicial decisions, *Land development, *Federal Water Pollution Control Act, *Water pollution, Water pollution sources, Land resources, Water management(Applied), Land use, *Florida, Land management, Fisheries, Jurisdiction, Navigable waters, Permits, Enforcement, Legislation, Water resources development, Water law, Adjudication procedure, Administrative decisions.
Identifiers: Injunctive relief, FWPCA Amendments of 1972, Fill permits, Navigability tests.

Action was brought by the United States to enjoin allegedly unlawful land-filling operations in Florida. The government contended that the defendants, land developers, had begun filling the waters of the bayou with sand, dredged spoil and organic materials without permits required by the Federal Water Pollution Control Act (FWPCA). The plaintiff alleged that continued discharge would result in irreparable injury, loss and damage to aquatic ecosystems of the area and to commercial and sport fisheries. The court held that the facts established acts of sufficient scope to warrant federal jurisdiction under the FWPCA, and issued a temporary injunction. The Court reasoned that Congress is not limited by the 'navigable

waters' test in its authority to control pollution under the commerce clause. It determined that the defendants' filling activities on land periodically inundated by tidal waters constituted discharges entering waters of the United States. Since this activity was done without permits, it was in violation of the statute. (Proctor-Florida)
W75-04005

BOATS AND RIPARIAN RIGHTS,
M. C. Leonard.
Women Lawyers Journal, Vol 47, p 9-12, 1961.

Descriptors: *Navigable waters, *Riparian rights, *Competing uses, *Public rights, Common law, Civil law, Legal aspects, Legislation, Water law, Governments, Navigation, Recreation, Water utilization, Riparian waters, Natural use, Riparian land, Public access, Connecticut, Shore protection, Regulation, Environmental control, Wetlands, State governments.
Identifiers: Environmental policy, State policy, Public trust doctrine, Navigability tests, Water rights(Non-riparians).

In the United States, a stream is navigable in law if it is navigable in fact. The law is well settled that lands underlying navigable waters within a state belong to the sovereign and may be used or disposed of as it sees fit--subject to the power of Congress under the commerce clause. In addition to the rights common to the public, the riparian owner has the right of access from his property to the navigable part of the stream. This right is subordinate to the public right of navigation and subject to rules and regulations imposed for the protection of the public right. When there is a conflict between these interests, antiquated laws impede solutions. There is no uniform law on this subject in the United States. This should force states to review their laws and follow the lead of Connecticut in preserving shorelines for the use of the general public. In Connecticut, the public owns the shores of navigable waters. The land between the high and low water mark is held in trust by the state. (Proctor-Florida)
W75-04006

EXPLOITATION OF DEEP OCEAN MINERALS: REGULATORY MECHANISMS AND UNITED STATES POLICY,
University of Southern California, Los Angeles.
R. D. Eckert.
The Journal of Law and Economics, Vol 17, p 143-177, April 1974. 87 ref.

Descriptors: *Minerals, *United States, *Regulation, *International law, Oceans, Governments, Legal aspects, Adoption of practices, Cost-benefit analysis, Economic aspects, Natural resources, Water rights, Mining, Mineral industry, Engineering, Research.
Identifiers: United Nations, International agreements, Territorial waters, Coastal waters.

Valuable minerals lie on the ocean bed at great depths. Rising prices for metals and improvements in the techniques of ocean mining have made seabed mining economically feasible. Unregulated competition to mine seabeds could lead to international conflict. The policy of the United States favors international agreements as the best means to insure both world stability and United States access. Investment in discovery and mining equipment would be discouraged without the creation of property rights to specific deposits. A United Nations of the Sea Conference of more than one hundred and fifty nations has been mandated to reach agreement on an international regime to control access to deep sea minerals. Cost-benefit analysis is used to analyze information on current seabed mining practices and the effects future regulation will provide for their efficient exploration. (Sperling-Florida)
W75-04007

SCATTERING FORK DRAINAGE DISTRICT, COUNTY OF DOUGLAS V. OGILVIE (SUIT CHALLENGING LEGALITY OF PROPOSED CONSRUCTION OF WATER RESERVOIR PROJECT).
311 NE 2d 203 (111 app 1974).

Descriptors: *Illinois, *Judicial decisions, *Jurisdiction, *Governmental interrelations, *Administrative agencies, Drainage districts, State jurisdiction, Control, Water law, Legal aspects, Reservoirs, Environmental control, Damages, Constitutional law, Reservoir construction, Legislation, State governments, Federal government, Local governments, Water management(Applied), Regulation, Administration, Multiple-purpose reservoirs, Adjudication procedure.
Identifiers: Injunctive relief, Environmental policy.

The plaintiff drainage district, joined by two private citizens, sought an injunction restraining the defendants, state officials, from entering into certain agreements with the United States Corps of Engineers relative to the proposed construction of the Lincoln Reservoir Project. The plaintiffs alleged (1) that the defendants were obliged, before entering into such agreements, to obtain the consent of the plaintiffs to secure a court adjudication establishing their authority to so act; (2) that water damage which was compensable under state law would not be fully compensated for under the proposed agreements; (3) that the proposed action violated property owners' constitutional right to a healthful environment; and (4) that the proposed actions violated provisions of the Environmental Protection Act. The lower court dismissed the plaintiffs complaint, with prejudice, ruling that the plaintiffs failed to state a claim upon which relief could be granted. The Appellate Court of Illinois affirmed. The court found no authority to support the plaintiffs' first three contentions and ruled that the complaint failed to sufficiently allege any violation of the Environmental Protection Act. (Deckert-Florida)
W75-04008

WPCF ADOPTS RESOLUTIONS AIMED AT EASING PROBLEMS OF WATER LAW.
Soap and Detergent Association, New York.
For primary bibliographic entry see Field 5G.
W75-04009

GUIDELINES FOR PREPARATION OF ENVIRONMENTAL STATEMENTS FOR REVIEWING AND COMMENTING ON ENVIRONMENTAL STATEMENTS BY OTHER FEDERAL AGENCIES.
Environmental Protection Agency, Seattle, Wash. Region X.
For primary bibliographic entry see Field 6G.
W75-04010

STANDARDS, ADMINISTRATION, AND SURVEYS, (LITERATURE REVIEW),
Delaware River Basin Commission, Trenton, N.J.
For primary bibliographic entry see Field 5G.
W75-04014

POLLUTION CONTROL IN JAPAN-A SURVEY.
For primary bibliographic entry see Field 5G.
W75-04017

PROGRESS IN SATISFYING ENVIRONMENTAL REQUIREMENTS,
Ebasco Services, Inc., New York.
For primary bibliographic entry see Field 5G.
W75-04018

LAW, (LITERATURE REVIEW),
Georgia Univ., Athens. Inst. of Government.
For primary bibliographic entry see Field 5G.
W75-04020

EPA'S POLLUTION CONTROL GOALS TAKE BROADSIDE IN SEATTLE.
For primary bibliographic entry see Field 5G.
W75-04023

ON POLLUTION CONTROL.
For primary bibliographic entry see Field 5G.
W75-04024

WHITHER WATER.,
For primary bibliographic entry see Field 6B.
W75-04025

REPORT ON: ARIZONA INDIAN WATER RIGHTS CONFERENCE,
W. Anderson, and C. Pattea.
Arizona Commission of Indian Affairs, August, 1973. 73 p.

Descriptors: *Water rights, *Arizona, *Water requirements, Water demand, Irrigation water, Irrigable land.
Identifiers: *Arizona Indians, Indian reservations.

The purpose of this conference was to gather information and promote an understanding of Indian water rights in Arizona. Suggestions and recommendations were made by federal, state, and Indian tribal members in order to promote understanding and provide the means for handling water rights problems on the Indian reservations. Included in this report are the complete statements of federal, state, and Indian agency representatives present at this conference having expertise or jurisdiction over water rights on Arizona Indian lands. (Mastic-Arizona)
W75-04143

THE MODEL WATER CODE, THE WISE ADMINISTRATOR AND THE GODDAM BUREAUCRAT,
Wyoming Uni., Laramie.
F. J. Trelease.
Natural Resources Journal, Vol 14, No 2, April, 1974. p 207-229.

Descriptors: *Water management(Applied), *Water permits, *Riparian rights, *Planning, *Water quality administration, *Water law, *Water rights, Water utilization, Water requirements, Water policy, Water distribution, Water users.
Identifiers: Model Water Code.

Designed for an easterner seeking a new water law for his state, the Model Water Code developed by Frank Maloney, Richard C. Ausness, and J. Scott Morris places all waters under a single rule of law and a single administration. 'A State Water Resources Board sits above three divisions concerned with water use, water quality, and weather modification' with supervisory authority over as many management districts as are needed to adequately cover the state. Trelease focuses on the code chapter dealing with water use permits and the administrator's role. A permit is issued for a 'reasonable-beneficial' use consistent with the public interest, providing it does not interfere with existing uses and the state water plan. The fundamental problem is the choice between property rights and administrative distribution. The administrator is expected to exercise discretion in dealing with reduction, restriction, changes in permits, suspension of permits, apportionment , rotation, limitation or prohibition and can take direct actions in an emergency situation. The Administrator may well assume the role of a bureaucrat 'juggling equality, equity, economic efficiency, public health and safety, protection of investment and protection of workers' jobs and farmers' livelihoods.' 'The Code's solution to the legal uncertainties of riparian rights is the substitution of these administrative uncertainties.' Duration of permits, shifts of use, priorities and shortages,

perpetual rights and flexibility, evils of prior appropriation are each discussed in terms of the Model Code which neglects to deal with the disparity between east and west water needs and does not address the need for equitable and qualitative distribution of water resources and their uses. (Salzman-North Carolina)
W75-04199

MORE RESPONSIVE WATER PLANNING IS POSSIBLE,
Washington State Univ., Pullman. R. L. Albrook Hydraulic Lab.
For primary bibliographic entry see Field 6A.
W75-04203

THE NEXT TEN YEARS: SOME RECOMMENDATIONS TO THE DELAWARE RIVER BASIN COMMISSION,
Pennsylvania Univ. Philadelphia. Inst. for Environmental Studies.
For primary bibliographic entry see Field 6B.
W75-04210

CONSERVATION AND FLOODING EASEMENTS: A CASE STUDY,
Pennsylvania Univ., Philadelphia. Inst. of Environmental Studies.
S. K. Slade.
December 1970. 21 p, 15 append. Federal Water Quality Administration, No. 16090 EDC.

Descriptors: *Water quality control, *Planning, *Water management(Applied), *Easements, *Water resources development, *Comprehensive planning, Water supply, Legal aspects, Eminent domain, Legislation, Local governments, Pennsylvania, Conservation, Administration.
Identifiers: *Bucks County(Penn), Neshaminy Creek(Penn), Neshaminy Water Resources Authority.

Although Pennsylvania possesses one of the strongest clean streams laws, the Commonwealth has not evolved any master plan for sewage disposal or water supply. Yet Bucks County by creating the Neshaminy Water Resources Authority has planned and acquired phases of a program for integrated water supply, water quality control, conservation, recreation and flood control on Neshaminy Creek. This study shows that planning coupled with knowledge of political realities and communication with the public brought this program into being and insured its success. Key factors in the program are affirmative approach to program; recognition of need to preserve quality of environment; assembly of competent planners and, most important, commitment of a large sum of money for land acquisition, engineering and construction costs, and contracts for scientific studies and tests. By undertaking the financial burdens, the County was able to acquire land through a planning program which encompassed appraisal, negotiating, condemnation and administrative (surveys, leasing policy) processes. The Neshaminy Program affords an excellent illustration of the implementation and problems in conducting an easement acquisition program. (Salzman-North Carolina)
W75-04211

WATER FOR THE HUMAN ENVIRONMENT, VOLUME IV, SPECIAL SESSIONS.
For primary bibliographic entry see Field 5B.
W75-04213

TOWARD A SCIENCE POLICY FOR COMPUTERS IN WATER RESOURCES: TRENDS AND ISSUES,
Illinois Univerity, Chicago. Dept. of Engineering.
For primary bibliographic entry see Field 6A.
W75-04257

A MODEL STUDY FOR THE PROJECTED INCREASE IN WATER USE IN KANE COUNTY, ILLINOIS, U.S.A.,
Northeastern Illinois University, Chicago, Illinois.
For primary bibliographic entry see Field 6B.
W75-04258

U.S. V. ROHM AND HAAS CO. (CONTINUOUS DISCHARGE POLLUTION ACTION UNDER REFUSE ACT).
500 F.2d 167 (5th Cir. 1974).

Descriptors: *Judicial decisions, *Legal aspects, *United States, *Texas, *Rivers and Harbors Act, Federal Water Pollution Control Act, Waste water discharge, Channels, Navigable waters, Water pollution, Water pollution sources, Permits, Adoption of practices, Legislation, Decision making, Administrative agencies, Administration, Pollution abatement, Water pollution control.
Identifiers: FWPCA Amendments of 1972, Injunctive relief, Liability(Legal aspects).

The United States brought action against the operator of a chemical plant in Texas under the Refuse Act. The district court entered an injunctive order setting limitations on the amount of various pollutants the defendant could discharge into the channel and totally enjoining the defendant from barging such wastes out to sea. The Court of Appeals held that the action, which was instituted prior to the 1972 Amendments of the Federal Water Pollution Control Act, was within the saving clause of the 1972 Amendments which provided that where a permit for discharge had been applied for there could be no violation of the Refuse Act until December 31, 1974. The injunctive order was modified to govern the operators conduct only before the permit had been issued, and eliminated entirely the restriction on the barging of wastes to sea, since this was outside the scope of the Refuse Act. A polluter discharging wastes in accordance with terms and conditions of a permit is not in violation of the Refuse Act. (Sperling-Florida)
W75-04290

BIDERMAN V. MORTON (SEEKING INJUNCTION TO RESTRAIN CONSTRUCTION ON FIRE ISLAND PENDING ENVIRONMENTAL IMPACT STATEMENT).
497 F.2d 1141 (2d Cir 1974).

Descriptors: *Legislation, *Decision making, *Judicial decisions, *Federal government, *Adoption of practices, Permits, Construction, Administrative agencies, Government finance, Local governments, Environmental effects, Planning, Regulation, Water law, Administration, New York, Zoning, Federal jurisdiction, Environmental control, Adjudication procedure.
Identifiers: Injunctive relief, National Environmental Policy Act, Environmental impact statement, Environmental policy.

Action was brought against federal and nonfederal government officials seeking an injunction to restrain the issuance of construction permits and the granting of zoning variances on Fire Island pending the completion of an environmental impact statement. Preliminary injunctive relief was denied, and this denial was upheld on appeal. The Court of Appeals said such relief was inappropriate under the circumstances, noting that congressional funding of the Fire Island National Seashore Act had been essentially exhausted. Furthermore relief against the municipal defendants was barred by the failure of plaintiffs to identify a discernible basis for the exercise of federal injunctive power over these nonfederal officials. The Fire Island National Seashore Act does not prohibit any zoning action by the various local governments located on the seashore. (Sperling-Florida)
W75-04291

U.S. V. LEBEOUF BROS. TOWING CO., INC. (GOVERNMENT ACTION TO RECOVER PENALTY IMPOSED BY COAST GUARD FOR GASOLINE SPILL IN OCEAN).
377 F. Supp. 558 (ED Louisiana 1974).

Descriptors: *Judicial decisions, *United States, *Penalties(Legal), *Oil spills, Boats, Water pollution, Water pollution sources, Water pollution control, Adoption of practices, Federal Water Pollution Control Act, Economic aspects, Navigable waters, Regulation, Legal aspects, Water law, Adjudication procedure, Legislation, Oil pollution, Administration.
Identifiers: Evidence.

Action was brought by the United States to recover a penalty which had been imposed by the Coast Guard against a towing company. One of the towing company's vessels had spilled gasoline into the ocean. The district court held that the penalty was criminal in nature, despite the fact that the statute denominated it a civil penalty. This being so, a provision of the Federal Water Pollution Control Act, providing that reports of oil spills which were required to be made upon pain of criminal liability could not be used against one making the report in any criminal proceeding, applied in the instant case. The imposition of a penalty upon one who discharges oil upon navigable waters may be enforced only if it is supported by information derived independently from a report filed pursuant to the Act. The test for whether a statutory penalty is civil or criminal is whether the legislative aim was to punish the party for engaging in the activity or to regulate the activity. (Sperling-Florida)
W75-04292

MINNESOTA PUBLIC INTEREST RESEARCH GROUP V. BUTZ (ACTION FOR INJUNCTIONS AGAINST LOGGING IN BOUNDARY WATERS CANOE AREA).
498 F.2d 1314 (8th Cir 1974).

Descriptors: *Judicial decisions, *Adjudication procedure, *Administrative decisions, *Public lands, Federal government, Water law, Forest management, Legislation, Regulation, Environmental effects, Environment, Evaluation, Environmental control, Legal review, Land management.
Identifiers: *National Environmental Policy Act, Environmental impact statements, Wilderness areas, Wilderness Act.

Action was brought in the United States Court of Appeals by a nonprofit corporation seeking temporary and permanent injunction against logging in the Boundary Waters Canoe Area (BWCA) until the Forest Service complied with the requirements of the National Environmental Policy Act (NEPA). Plaintiffs allege that timber cutting authorized by the Forest Service constitutes a major federal action requiring compliance with NEPA. The plaintiffs contend that the logging activities should be banned in BWCA because they are incompatible with the requirements of the wilderness system of which BWCA is integral. The defendants argue that logging is specifically provided for in the BWCA by the Wilderness Act. The Court affirmed the judgment of the lower court, holding that the activities of the Forest Service in relation to timber sales constitutes major federal action significantly affecting the quality of the human environment. As a result the Court concluded that an environmental impact statement must be made. The appellate court also sustained lower court's grant of injunction not constituting an abuse of discretions. (Proctor-Florida)
W75-04293

OPINION OF THE JUSTICES TO THE HOUSE OF REPRESENTATIVES (RELATING TO THE CONSTITUTIONALITY OF A BILL CREATING

A PUBLIC 'ON-FOOT FREE RIGHT-OF-PASSAGE' ALONG SHORE OF COASTLINE).
313 N.E.2d 561 (Mass 1974).

Descriptors: *Right-of-way, *Legal aspects, *Public access, Judicial decisions, Real property, Eminent domain, Navigable waters, Shores, Constitutional law, Common law, Public rights, Water law, Water resources development, State governments, Massachusetts, Legal review, Adjudication procedure, Legislation, Compensation, Public benefits, Riparian rights.
Identifiers: *State policy, *Declaratory judgments, *Water rights(Non-riparians).

A question was propounded by the House of Representatives to the Justices of the Supreme Judicial Court of Massachusetts relating to the constitutionality of a bill creating a 'public on-foot free right-of-passage' along the shore of the coastline between the mean high water line and the extreme water line subject to certain restrictions. The right-of-way stemming from the reserved interests of the public in the land is only to be exercised after sunrise and is not to be exercised in those areas designated by the Commissioner of the Department of Natural Resources as being of critical ecological significance. The court was of the opinion that if enacted, the ordinance would violate the provisions of the Constitutions of the Commonwealth of Massachusetts and the United States. The bill would amount to a taking of private property for public purposes without due compensation and would therefore be violative of the 'due process' strictures of the state and federal constitutions. (Proctor-Florida)
W75-04294

FREEMAN COAL MINING CORP. V. ILLINOIS POLLUTION CONTROL BOARD (APPEAL FROM OF POLLUTION CONTROL BOARD HOLDING THAT DEFENDANT MADE ILLEGAL DISCHARGES).
313 N.E.2d 616 (Ill App 1974).

Descriptors: *Water pollution, *Water pollution sources, *Acid mine water, *Water pollution control, *Pollution abatement, *Judicial decisions, Mining, Mining wastes, Coal mines, Water quality, Water quality control, Waste treatment, Damages, Discharge(Water), Water law, Water resources development, Illinois, Administrative decisions, Adjudication procedure, Treatment facilities, Environmental control, Legal review.
Identifiers: *Effluent limitations, *Liability(Legal aspects).

An appeal was made to the Illinois Appellate Court from an order of the Pollution Control Board requiring a coal mining corporation to desist from polluting water in violation of the State Water Pollution Regulations, and to maintaiits water treatment facility in a condition sufficient to meet effluent criteria promulgated by the Pollution Control Board. The petitioner argues that it should not be liable for the discharges because such discharges result from rainwater, a natural force beyond the control of petitioner, interacting with mining sludge, which was created prior to the enactment of the regulations. The Court found that the mine owner, by building a treatment facility for the acid runoff water and by making subsequent improvements, had intended to control the discharges. Therefore, petitioner was estopped from using a defense of lack of control over the discharge. Petitioner's intentions go only to the mitigation of damages. The court also held that even though the treatment to prevent pollution discharges imposed a financial burden on the petitioner, this was no defense and does not excuse petitioner from the responsibility to treat the discharges. (Proctor-Florida)
W75-04295

RESERVE MINING CO. ET. AL. V. UNITED STATES (MOTION FOR STAY OF INJUNCTION).
498 F2d 1073 (8th Cir 1974).

Descriptors: *Minnesota, *Judicial decisions, *Legal aspects, *Pollution abatement, Public health, Water law, Federal jurisdiction, Water pollution, Water pollution sources, Water pollution control, Water pollution effects, Water quality control, Federal government, State governments, Governmental interrelations, Federal Water Pollution Control Act, Air pollution, Air pollution effects, Asbestos, Industrial wastes, Pollutants, Waste disposal, Lake Superior, Mineral industry, Iron, Adjudication procedure, Legal review, Legal aspects, Planning.
Identifiers: Evidence, Injunctive relief, *Hazardous substances, Nuisance(Legal aspects), Refuse Act of 1899.

The federal government, joined by several state governments and environmental groups, brought action seeking an injunction barring the corporate defendants from continuing operation of their taconite ore processing plant located at Silver Bay, Minnesota. The plaintiffs contended that the plant's discharge of asbestiform particles into the air and Lake Superior viclated federal and state pollution standards and presented an immediate public health hazard. A Federal District Court ordered the plant closed and the defendants appealed. The defendants moved for a stay of the injunction pending their appeal, contending that the evidence did not support the lower court finding that their operations constituted a public health hazard. The Eighth Circuit Court of Appeals held that evidence showing that the discharges might result in a health hazard did not support a ruling that such hazard did indeed exist. The court stayed the injunction, conditioned upon the defendants taking prompt steps to abate the discharges and submitting their plans for on-land disposal and control of air emissions to the court for review. (Deckert-Florida)
W75-04296

FORD MOTOR CO. V. DALLAS POWER AND LIGHT CO. (ACTION FOR PROPERTY DAMAGE RESULTING FROM RELEASE OF WATERS FROM DAM DURING TIME OF FLOODING).
499 F2d 400 (5th Cir 1974).

Descriptors: *Judicial decisions, *Texas, *Surface runoff, *Dams, Electric powerplants, Legal aspects, Economic aspects, Flooding, Legislation, Water law, Flood damage, Natural flow, Water resources, Water rights, Legal review, Floodwater, Discharge(Water), Water injury, Overflow, Negligence, Adjudication procedure.
Identifiers: *Liability(Legal aspects).

A case in the Fifth Circuit Court of Appeal concerned personal property damage resulting from the defendant power company's release, during a time of flooding, of waters through the power company's dam. The district court in Texas narrowed the case to one based on negligence and denied recovery on answers of contributory negligence. The fifth circuit reversed holding that interrogatories were improperly refused which attempted to base liability on a theory similar to strict liability. Under Texas law, negligence is not a critical factor in assessing liability for water damage where there has been a violation of the Texas Surface Water Act. Under this act liability results when there is a diversion of surface water from its place of natural flow, resulting in an injury to the owner of a lower estate. Under Texas law where a substantial invasion of land of another through the interference with the flow of surface water is intentional, liability depends on whether the invasion is unreasonable. (Sperling-Florida)
W75-04297

UNITED STATES V. BOYD (DISCHARGE OF OIL INTO NAVIGABLE WATERS).
1 Pollution Control Guide, Vol 3, paragraph 15067, p 15487-15491, June 3, 1974.

Descriptors: *Federal Water Pollution Control Act, *Oil spills, *Navigable waters, *Control, *Judicial decisions, United States, Legislation, Water quality standards, Administrative agencies, Environment, Regulation, Public health, Water quality, Ships, Shores, Protection, Oil pollution, Administration, Water quality control, Federal government, Pollution abatement.
Identifiers: *Federal Water Quality Improvement Act, Standing(Legal), Hazardous substances(Pollution), Evidence.

Defendant ship captain appealed from the decision of the federal district court in a criminal action brought by plaintiff United States charging defendant with discharging oil into navigable waters of the United States and not immediately notifying the appropriate federal agency pursuant to the Federal Water Pollution Control Act. The main issue was whether defendant had discharged oil in harmful quantities (sheen test). The district court convicted defendant, suspended sentence, and placed him on one year probation. On appeal defendant primarily contended that the sheen test improperly defined as harmful a broader class of oil discharges than Congress intended and was, therefore, invalid. Defendant next contended that the sheen test was devised to achieve workable administration, thereby subverting Congressional intent. Defendant further contended that the exception to the sheen test--discharges of oil from a properly functioning vessel engine--demonstrated the irrationality of the test. Finally defendant contended that the Act unconstitutionally denied him due process because, when coupled with the sheen test, it was too vague. The Court of Appeals rejected these contentions. It ruled that the sheen test was not unreasonable, vague, or unconstitutional and, thereupon, ordered the judgement of the district court affirmed. (Chennault-Florida)
W75-04298

VERMONT V. NEW YORK, ET AL. (PROPOSED CONSENT DECREE DISAPPROVED).
1 Pollution Control Guide, Vol 3, paragraph 15069, p 15499-154503, June 10, 1974. 7 ref.

Descriptors: *Water pollution control, *Discharge(Water), *Judicial decisions, *Adjudication procedure, Sludge, Sediments, Waste water, Interstate compact, Jurisdiction, Equitable apportionment, *New York, *Vermont, Wastes, Effluents, Water level, United States, Regulation, Standards, Dredging, Compacts, Ponds, Lakes, Tributaries, Navigation, Interstate, Governmental interrelations, Enforcement, Water quality control, Water quality standards.
Identifiers: *Nuisance(Legal aspects).

Plaintiff State of Vermont brought suit in the United States Supreme Court alleging that defendants State of New York and paper company were responsible for a sludge bed in its state waters which polluted the water, impaired navigation, and constituted a public nuisance. Issue was joined and a Special Master was appointed. The United States intervened as an interested party. The parties reached a settlement, in the form of a consent decree, which the Special Master recommended to the Court for approval. The proposed consent decree stipulated that no findings be made and that its provisions not constitute an adjudication on any issue of fact or law. It also requested the appointment of a special master who would police the execution of the proposed decree and submit to the Court for its approval his proposed resolutions of future contested issues. The Court rejected the decree and refused to appoint a Special Master. The Court concluded that such a decree would force it to act as an arbitrator of disputes and would thus extend the judicial power

of the Court beyond its constitutional limitations. (Chennault-Florida)
W75-04299

UNITED STATES V. IRA. S. BUSHEY AND SONS, INC. (DISCHARGE OF REFUSE INTO NAVIGABLE WATERS--OIL SPILLS),
1 Pollution Control Guide, Vol 3, paragraph 15077, 15541-15550, 1974.

Descriptors: *Rivers and Harbors Act, *Oil spills, *Water pollution, *Navigable waters, Oil pollution, Regulations, United States, Navigation, Environmental effects, Beaches, Lakes, Barges, Recreation, Oil, Gasoline, Wildlife, Environment, Water users, Water supply, Vermont, Federal Water Pollution Control Act, Judicial decisions, Federal government.
Identifiers: *Refuse Act of 1899, *Injunctive relief.

Plaintiff United States brought action to obtain injunctive relief against defendant corporate shipowner, whose vessels, in repeatedly discharging oil into the Vermont waters of Lake Champlain, had irreparably damaged beaches, public water supplies, waterfowl and fish, violated the provisions of the Refust Act, and created a public nuisance. The facts were uncontroverted. The Federal Water Pollution Control Act Amendments of 1972 did not preclude granting equitable relief and the Refuse Act of 1899 made such relief available. The United States District Court found that plaintiff was entitled to equitable relief, and ordered that defendant be permanently enjoined to operate and supervise all vessels and personnel employed by it in Lake Champlain to comply with the requirements specified by plaintiff, which were not in conflict with the authority of the United States Coast Guard of with provisions of the navigation rules for harbors, rivers and inland waters. (Chennault-Florida)
W75-04300

COURTS BACK STATE'S POWER TO HALT ACID MINE DRAINAGE,
For primary bibliographic entry see Field 5G.
W75-04301

SENATE SUBCOMMITTEE HEARS COMPLAINTS ON EPA WATER PROGRAMS.
For primary bibliographic entry see Field 5G.
W75-04302

NON-TRANSPORTATION OIL SPILL REGULATIONS.
For primary bibliographic entry see Field 5G.
W75-04303

PEOPLE (N.Y.) V. CUDAK (PROSECUTION FOR VIOLATING MORATORIUM ON ALTERATION OF TIDAL WETLANDS),
358 N.Y.S.2d 909 (Dist Ct Suffolk Cty 1974).

Descriptors: *New York, *Judicial decisions, *Regulation, *Tidal marshes, *Law enforcement, Environmental control, Environmental effects, Administration, Water law, State governments, State jurisdiction, Legal aspects, Marshes, Wetlands, Administrative agencies, Legislation, Coastal marshes, Management, Water quality control, Water policy, Penalties(Legal), Preservation, Conservation, Adjudication procedure, Adoption of practices.
Identifiers: Administrative regulations, Coastal zone management, State policy, Liability(Legal aspects).

The defendants, an individual and a corporation, were prosecuted by the state of New York for allegedly violating the state's moratorium on alteration of tidal wetlands by dumping fill on or adjacent to wetlands. Section 25-0202 of the Environmental Conservation Law proscribes the alteration of any tidal wetland or any area immediately adjacent to such wetland which the Commission of Environmental Conservation may reasonably deem necessary. The Commissioner had determined that such adjacent area would extend 300 feet landward but had not recorded the ruling with the Secretary of State. The District Court, Suffolk County, ruled that under New York law, the ruling was not effective as a regulation until it had been so recorded. The court also ruled that, under the statute, it had no power to determine on a factual or case-by-case basis whether a particular area was 'adjacent' to a tidal wetland. Accordingly, on finding that the state failed to prove beyond a reasonable doubt that the defendants had dumped their fill directly onto wetlands, the court found the defendants not guilty. (Proctor-Florida)
W75-04304

WATER REUSE...SAFE DRINKING ACT...HOW SOON...HOW GOOD.
For primary bibliographic entry see Field 5G.
W75-04322

CONTROL OF WATER POLLUTION: MISCELLANEOUS PROVISIONS.
For primary bibliographic entry see Field 5G.
W75-04323

POLLUTION AND PUBLIC HEALTH: TACONITE CASE POSES MAJOR TEST,
For primary bibliographic entry see Field 5G.
W75-04326

6F. Nonstructural Alternatives

CONSERVATION AND FLOODING EASEMENTS: A CASE STUDY,
Pennsylvania Univ., Philadelphia. Inst. of Environmental Studies.
For primary bibliographic entry see Field 6E.
W75-04211

THE DELAWARE ESTUARY SYSTEM, ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC EFFECTS. ANNEX TO VOLUME I. MANAGEMENT AGENCY PROBLEMS IN THE DELAWARE ESTUARY,
Delaware Univ., Newark; and Academy of Natural Sciences of Philadelphia, Pa.
W. V. McGuinness, Jr.
Final Report (partial) April, 1973. 92 p, 3 fig, 2 tab, 6 append.

Descriptors: *Management, *Estuaries, *Planning, *Water management, *Waste disposal, *Delaware, *Estuarine environment, *Pollution abatement, Water control, Waste treatment, Water pollution, Water quality, Water consumption, Water law, Water policy, Water sources, Water treatment, Water utilization, Water conservation, Research priorities, Leadership, Decision making, Administration.
Identifiers: *Delaware Estuary System(Delaware), RANN, Problem matrix, Societal priorities.

Major estuarine-related management areas and related problems in the Delaware Estuary are identified and ranked according to societal priorities. Key managers were interviewed, and priorities were determined from their collective views. Management areas ranked as follows: highest-waste disposal; high-comprehensive planning and management, recreation, institutional and legal, and shipping; medium-commercial fishing, wetlands management, commercial land use, and residential land use; low-water supply, shore erosion, preservation and aesthetics; and lowest-sand and gravel extraction. Included is a problems matrix of four priorities, with fourteen problem areas listed for each. Under Priority A, for example, is included abating unrecorded pollution, regionalization, unrecorded pollution loads, urban waterfront renewal, wetland values, biological implications, deep water ports, capability to support basic uses, land use management techniques, dredge spoil disposal, cost effectiveness in pollution control, attitudes and education, and translating research into action. Criteria for selecting the 56 problems included the number of interviewees who cited it, the emphasis placed on it, the stature of the interviewee, and the judged significance of not solving the problem. (Grden-North Carolina)
W75-04328

6G. Ecologic Impact Of Water Development

EVALUATION OF INTERREGIONAL INPUT-OUTPUT MODELS FOR POTENTIAL USE IN THE MCCLELLAN-KERR ARKANSAS RIVER MULTIPLE PURPOSE PROJECT IMPACT STUDY,
Catholic Univ. of America, Washington, D.C. Inst. of Social and Behavioral Research.
For primary bibliographic entry see Field 4A.
W75-03923

GUIDELINES FOR PREPARATION OF ENVIRONMENTAL STATEMENTS FOR REVIEWING AND COMMENTING ON ENVIRONMENTAL STATEMENTS BY OTHER FEDERAL AGENCIES.
Environmental Protection Agency, Seattle, Wash. Region X.
Available from National Technical Information Service, Springfield, Va. 22161, as PB-226 998, $4.25 in paper copy, $2.25 in microfiche. April 1973. 249 p.

Descriptors: *Comprehensive planning, *Environmental control, Environment, Water resources development, Water pollution, Air pollution, Water pollution control, Management, Legislation, Agencies, Coordination, Water law, Pollution abatement, Water management(Applied), Interagency cooperation.
Identifiers: *Environmental Impact Statements, *Environmental policy, *National Environmental Policy Act.

An objective of the United States Environmental Protection Agency (EPA) is to assist other government agencies in developing an environmental ethic for their planning and action programs. This function assures that environmental values receive equal consideration with economics and need in the federal decision making process. Environmental Impact Statements (EIS) are the vehicles to accomplish environmental evaluations. Carefully planned and prepared EIS must be the unvarying rule if the environment is to be protected. Guidelines to be followed in preparing the EIS are presented. Included are sections on the National Environmental Policy Act, content of EIS, general guidelines, guidelines for specific projects such as dredging and spoil disposal and water resource development, and regional review procedures. Also included are pertinent federal statutes, executive orders, and memos from the Council on Environmental Quality and the Office of Management and Budget. (Proctor-Florida)
W75-04010

SYMPOSIUM ON POPULATION EXPOSURES,
Health Physics Society, East Weymouth, Mass.
For primary bibliographic entry see Field 5C.
W75-04152

CONSIDERATION OF BACKGROUND IN DEVELOPMENT OF ENVIRONMENTAL STANDARDS,
Georgia Inst. of Tech., Atlants. Office of Interdisciplinary Programs.
For primary bibliographic entry see Field 5G.
W75-04155

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING, THE CLARION RIVER BASIN, PENNSYLVANIA.
Federal Power Commission, Washington, D.C. Bureau of Power.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB 232 186, $4.25 paper copy, $2.25 microfiche. Appraisal Report, 1974. 61 p, 24 fig, 14 tab.

Descriptors: *Water resources development, *Hydroelectric project licensing, *Powerplants, Flood control, Hydroelectric power, Water quality control, Water supply, Dams, Recreation, Fish, Wildlife, Watersheds(Basins), Evaluation, Reclamation, *Pennsylvania.
Identifiers: *St. Petersburg reservoir(Penn), Clarion River Basin(Penn).

Information was provided to use in considering hydroelectric licensing, relicensing, or recommendation for Federal takeover of the Clarion River basin. A comprehensive plan for flood control, hydroelectric power generation, water quality control, water supply, recreation, fish and wildlife enhancement, and land reclamation was found to be economically feasible by the Corps of Engineers in its 1969 study of the Appalachian Region. Construction of the St. Petersburg reservoir would inundate the existing Piney hydroelectric project and preclude the development of the possible dam sites at Foxburg and at Mill Creek, and Cooksburg. The potential projects, Mill Creek, Cooksburg, and Foxburg, are alternative developments to the St. Petersburg project. The alternatives are less favorable than St. Petersburg and were not expected to be seriously considered. (Dawes-ISWS)
W75-04274

BIDERMAN V. MORTON (SEEKING INJUNCTION TO RESTRAIN CONSTRUCTION ON FIRE ISLAND PENDING ENVIRONMENTAL IMPACT STATEMENT).
For primary bibliographic entry see Field 6E.
W75-04291

MINNESOTA PUBLIC INTEREST RESEARCH GROUP V. BUTZ (ACTION FOR INJUNCTIONS AGAINST LOGGING IN BOUNDARY WATERS CANOE AREA).
For primary bibliographic entry see Field 6E.
W75-04293

THE DELAWARE ESTUARY SYSTEM, ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC EFFECTS. ANNEX TO VOLUME I. MANAGEMENT AGENCY PROBLEMS IN THE DELAWARE ESTUARY,
Delaware Univ., Newark; and Academy of Natural Sciences of Philadelphia, Pa.
For primary bibliographic entry see Field 6F.
W75-04328

7. RESOURCES DATA

7A. Network Design

THE PROCESSING AND STORAGE OF WATER-QUALITY DATA IN THE NATIONAL WATER DATA STORAGE AND RETRIEVAL SYSTEM,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-03970

THE ULTRASONIC METHOD OF RIVER GAUGING,
Department of the Environment, Reading (England). Water Data Unit.
For primary bibliographic entry see Field 4A.
W75-04026

CLASSIC CANAL THEORY WITH GRAPHS AND TABLES. VOLUME I,
Hawaii Inst. of Geophysics, Honolulu.
For primary bibliographic entry see Field 8B.
W75-04269

7B. Data Acquition

AN ENERGY PARTITION EVAPORATION RECORDER,
Commonwealth Scientific and Industrial Research Organization, Mordiallc (Australia). Div. of Atmospheric Physics.
For primary bibliographic entry see Field 2D.
W75-03937

MONITOR FOR THE QUALITY OF AUSTRALIA'S WATER RESOURCES,
Commonwealth Scientific and Industrial Research Organization, Clayton (Australia). Div. of Chemical Physics.
For primary bibliographic entry see Field 5A.
W75-03939

APPLICATION OF SURFACE MODERATORS TO MEASUREMENT OF WATER CONTENT IN FIELD TOPSOILS WITH A NEUTRON MOISTURE DEPTH GAUGE,
Commonwealth Scientific and Industrial Research Organization, Canberra (Australia). Div. of Plant Industry.
For primary bibliographic entry see Field 2G.
W75-03940

SPECIAL TECHNIQUES FOR DETERMINING CHEMICAL PROPERTIES OF GEOTHERMAL WATER,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2K.
W75-03980

USEFULNESS OF ERTS-1 AND SUPPORTING AIRCRAFT DATA FOR MONITORING PLANT DEVELOPMENT AND RANGE CONDITIONS IN CALIFORNIA'S ANNUAL GRASSLAND,
California Univ., Berkeley. School of Forestry and Conservation.
For primary bibliographic entry see Field 4A.
W75-03990

DETERMINING LAND USE CHANGES IN WATERSHEDS BY AERIAL PHOTOGRAPHIC MEASUREMENTS,
Clemson Univ., S. C. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4C.
W75-04051

SOME CHARACTERISTICS OF UPPER CLOUDS AND SUGGESTIONS REGARDING THE UTILIZATION OF RADIOACTIVE TRACERS IN MERIDIONAL FLOWS,
For primary bibliographic entry see Field 2B.
W75-04059

ACCOUNTING FOR SOME NONSTEADY PROCESSES IN RECORDING NATURAL AIR RADIOACTIVITY,
For primary bibliographic entry see Field 5A.
W75-04080

STUDY OF THE RESISTANCE OF FIBROUS FILTERING MATERIALS IN RAREFIED AIR,
For primary bibliographic entry see Field 5A.
W75-04105

A FLOTATION METHOD FOR THE RAPID MEASUREMENT OF THE WET BULK DENSITY OF SOIL CLODS,
National Inst. of Agricultural Engineering, Penicuik (Scotland).
For primary bibliographic entry see Field 2G.
W75-04135

USE OF A MICROWAVE REMOTE SENSOR FOR DETERMINATION OF WATER IN SUBSOILS,
Missouri Univ., Rolla. Dept. of Electrical Engineering.
For primary bibliographic entry see Field 2G.
W75-04149

DEVELOPMENT OF A PROTOTYPE AIRBORNE OIL SURVEILLANCE SYSTEM - VOLUME I - SYSTEM DEFINITIONS STUDIES.
Aerojet Electrosystems Co., Azusa, Calif.
For primary bibliographic entry see Field 5A.
W75-04259

PROJECT SKYWATER.
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 3B.
W75-04265

OPEN CHANNEL FLOW EVAPORATION STUDY,
Bonneville Power Administration, Portland, Oreg.
For primary bibliographic entry see Field 2D.
W75-04273

THE USE OF STEREO, HORIZONTAL, AND GROUND LEVEL ORIFICE GAGES TO DETERMINE A RAINFALL-ELEVATION RELATIONSHIP,
Eidgenoessische Technische Hochschule, Zurich (Switzerland). Versuchsanstalt fuer Wasserbau, Hydrologie und Glaziologie.
For primary bibliographic entry see Field 2B.
W75-04330

DEEP SNOW MEASUREMENTS SUGGESTED USING COSMIC RADIATION,
National Weather Service, Silver Spring, Md.
For primary bibliographic entry see Field 2C.
W75-04331

LYSIMETER INSTALLATIONS IN SANDSTONE AT STYRRUP, NOTTINGHAMSHIRE,
Institute of Geological Sciences, London (England). Dept. of Hydrogeology.
For primary bibliographic entry see Field 2G.
W75-04332

A GAMMA TRANSMISSION METHOD FOR THE DETERMINATION OF MOISTURE CONTENT IN SOILS,
Uttar Pradesh Irrigation Dept., Locknow (India).
For primary bibliographic entry see Field 2G.
W75-04343

7C. Evaluation, Processing and Publication

DATA REDUCTION METHODS FOR HYDROLOGIC ANALYSES,
Los Angeles County Sanitation Districts, Whittier, Calif.
K. L. Lewinger, D. P. Loucks, and E. A. McBean.

Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 101, No. HY1, Proceedings paper No. 11053, p 17-27, January 1975. 6 fig, 4 equ, 6 ref.

Descriptors: Hydraulics, Hydrology, *Information retrieval, *Data processing, *Computer programs, *Hydrologic data, Optimization, Least squares method, Water resources, Costs.
Identifiers: Data reduction, Data systems.

The determination of what portion of data is or is not needed to describe a phenomenon is partly a problem of economics. One can examine the tradeoff between the loss in relative accuracy of the reduced data and the savings in computer and storage costs. Three numerical methods are presented for reducing the quantity of data required to define the time series of relatively stable hydrologic parameters. The feasibility of each method is examined, showing the associated savings in computation time and data storage (and therefore in cost). The percentage reduction obtained depends on the allowable measurement and approximation error and the percentage of time this total error may be exceeded. The hydrologic data used in this study suggest that reductions of 25% or more may be possible without a significant loss of accuracy if the measured data are within 5% - 10% of the true value 95% of the time. (Bell-Cornell)
W75-03929

CHANCE-CONSTRAINED DYNAMIC PROGRAMING AND THE OPTIMIZATION OF WATER RESOURCE SYSTEMS,
New South Wales Univ., Kensington (Australia).
For primary bibliographic entry see Field 4A.
W75-03934

STOCHASTIC MODELS FOR THE INTERACTION OF RAINFALL AND GROUNDWATER LEVELS,
Purdue Univ., Lafayette, Ind.
For primary bibliographic entry see Field 2A.
W75-03949

LAKES OF OREGON: VOLUME 2. BENTON, LINCOLN, AND POLK COUNTIES,
Geological Survey, Portland, Oreg.
For primary bibliographic entry see Field 2H.
W75-03968

CREST-STAGE GAGING STATIONS IN OREGON--A COMPILATION OF PEAK DATA COLLECTED FROM OCTOBER 1952 TO SEPTEMBER 1974,
Geological Survey, Portland, Oreg.
J. Friday.
Open-file report, October 1974. 160 p, 7 fig, 1 tab.

Descriptors: *Crest-stage gages, *Basic data collections, *Peak discharge, *Small watersheds, *Oregon, Streamflow, Hydrologic data, Gages, Gaging stations, Stage-discharge relations.
Identifiers: Crest-stage stations.

Stage and discharge data associated with recorded annual peak flows are tabulated for 232 crest-stage stations in Oregon. The stations (active and discontinued) are located in all parts of the State and are operated to provide flood information at drainage basins having generally less than 10 sq mi. (Knapp-USGS)
W75-03969

THE PROCESSING AND STORAGE OF WATER-QUALITY DATA IN THE NATIONAL WATER DATA STORAGE AND RETRIEVAL SYSTEM,
Geological Survey, Reston, Va.
M. D. Edwards.
Availabile from National Technical Information Service, Springfield, Va. 22161, as PB-236 246, $4.25 paper copy, $2.25 microfiche. Computer Contribution, September 1974. 85 p, 3 fig, 1 tab.

Descriptors: *Computer programs, *Data storage and retrieval, *Data processing, *Hydrologic data, Data collections, Basic data collections, *Water quality.

The computer program used by the United States Geological Survey to store water-quality and other data in the Water-Quality File of the National Water Data Storage and Retrieval System is described. Chemical, physical, biological, and radiochemical parameters for both surface and groundwaters may be processed and stored. Data for other parameters may also be processed and stored if desired. Complete descriptions of the computer program, the operation, and the functional capabilities of the system are presented. (Knapp-USGS)
W75-03970

THE OBSERVATION-WELL NETWORK OF THE U.S. GEOLOGICAL SURVEY IN FLORIDA,
Geological Survey, Tallahassee, Fla.
H. G. Healy.
Florida Bureau of Geology Map Series No. 65, 1974. 1 sheet, 1 fig, 2 tab, 3 ref.

Descriptors: *Observation wells, *Florida, *Basic data collections, *Hydrologic data, Water levels, Water quality, Sampling, *Maps.

An observation-well network has been established throughout Florida to evaluate the status of groundwater resources in each aquifer. The network provides basic documentation of the effects of natural variations and the effect of man on the groundwater resource. The network also provides the data by which the potential of the groundwater resources can be determined. The observation-well network is part of the statewide hydrologic monitoring network used to evaluate the total water resources of the State. The network is constantly being revised in response to the varying needs brought about by water-resource problems and application of new hydrologic techniques. Water-level measurements are made on a continuous or periodic basis. The frequency of measurement is determined primarily by the use of the record. In addition to the water-level monitoring netowrk, an extensive quality-of-groundwater network is maintained by the U.S. Geological Survey in Florida. Water samples were being collected for chemical analyses from 509 wells in 34 counties as of January 1974. (Knapp-USGS)
W75-03971

GEOHYDROLOGIC MAP OF SOUTHERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
W. R. Moyle, Jr.
Water-Resources Investigations 48-73 (open-file report), 1974. 1 map, 19 ref.

Descriptors: *Hydrogeology, *California, *Maps, Water levels, Aquifer characteristics, *Groundwater movement, Geologic mapping, Groundwater basins.

This geohydrologic map of southern California illustrates the general pattern of groundwater flow in the unconsolidated deposits of the area. Generalized geology and water-level contours are shown in the various basins in an area bounded by the California-Arizona-Nevada State line, the Mexicon border, the California coast line, the surface-water drainage at the crest of the Sierra Nevada, and the drainage divide between the coast and the San Joaquin Valley. (Knapp-USGS)
W75-03973

LIMNOLOGICAL DATA FROM SELECTED LAKES IN THE SAN FRANCISCO BAY REGION, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2H.
W75-03975

HYDROLOGIC DATA FOR 1973, BROWARD COUNTY, FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 3B.
W75-03976

WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN THE NORTHERN GREAT PLAINS COAL REGION OF EASTERN MONTANA, 1974-75.
Geological Survey, Helena, Mont.
Open-file report, January 1975. 22 p, 8 fig.

Descriptors: *Basic data collections, *Groundwater, *Surface waters, *Montana, *Coal mines, Water supply, Streamflow, Water yield, Hydrologic data.

A water data-collection program and interpretive hydrologic investigations are being conducted by the U.S. Geological Survey in the Northern Great Plains coal region of eastern Montana, an area of intense interest for coal companies, utilities, State and Federal agencies, universities, landowners, and environmental groups. In October 1974 there were 39 surface-water and 47 water-quality stations in the region for collection of streamflow, chemical-quality, sediment, and temperature data. These stations are located on all types of streams from the main-stem Yellowstone and Missouri Rivers to small ephemeral and intermittent streams that drain proposed mine areas. Groundwater investigations are being conducted to determine the areal hydrology of the Madison Group and associated Paleozoic rocks and the areal and site hydrology of shallow aquifers in the Fort Union Formation, including the coal beds. Available data, mostly from oil tests, indicate that the Madison may yield water suitable for use in energy development in the Northern Great Plains coal region. Most of the field work in the shallow groundwater study is a partial data inventory of wells and springs and construction of a few wells for water sampling, aquifer testing, and water-level measurements. A computer model is being constructed to determine the effect on stream temperature of selected increases in withdrawal rates, and thus reduced flow, of the Yellowstone River from Billings to Sidney, Montana. (Knapp-USGS)
W75-03977

WATER-RESOURCES DATA COLLECTED IN THE DEVILS HOLE AREA, NEVADA, 1973-74,
Geological Survey, Las Vegas, Nev.
J. D. Larson.
Open-file report, 1974. 12 p, 7 fig, 1 tab, 1 ref.

Descriptors: *Water levels, *Withdrawal, *Springs, *Nevada, Killifishes, Irrigation water, Hydrogeology, Basic data collections, Hydrologic data, Regimen.
Identifiers: *Devils Hole pupfish.

Water-level, spring-flow, and power-consumption data were collected in the Devils Hole area of Nevada from July 1973 through June 1974. Continuous recorders were used to monitor water levels in Devils Hole, two observation wells, and the flow from four springs. Also, monthly readings were made on two wells to help define a general trend of groundwater levels. Monthly meter readings of six electrically powered irrigation wells provided a record of power consumption, which in turn is a measure of the amount of water pumped. The purpose of the work is to observe the effects of groundwater withdrawals for irrigation on the level in Devils Hole and the flow from the major springs in the area. The pool in Devils Hole,

which is a collapsed fault structure, is the only native habitat of desert pupfish, Cyprinodon diabolis. (Knapp-USGS)
W75-03978

GEOLOGY AND GROUND-WATER RESOURCES OF GORDON, WHITFIELD, AND MURRAY COUNTIES, GEORGIA,
Geological Survey, Atlanta, Ga.
For primary bibliographic entry see Field 2F.
W75-03984

GEOHYDROLOGY OF NEMAHA COUNTY, NORTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
For primary bibliographic entry see Field 2F.
W75-03986

GEOLOGY AND GROUND-WATER RESOURCES OF MONTGOMERY COUNTY, SOUTHEASTERN KANSAS,
Geological Survey, Lawrence, Kans.
For primary bibliographic entry see Field 2F.
W75-03987

PRECONSTRUCTION ASSESSMENT OF BIOLOGICAL QUALITY OF THE CHENA AND LITTLE CHENA RIVERS IN THE VICINITY OF CHENA LAKES FLOOD CONTROL PROJECT NEAR FAIRBANKS, ALASKA,
Geological Survey, Anchorage, Alaska.
For primary bibliographic entry see Field 5B.
W75-03988

THE DILUTION CAPACITY OF SMALL STREAMS IN SOUTH CAROLINA,
South Carolina Univ., Columbia. Dept. of Geology.
For primary bibliographic entry see Field 5B.
W75-04050

RAPID SYSTEM OF AUTOMATIC PUNCH-TAPE OUTPUT OF INFORMATION FROM THE AI-100-1 ANALYZER,
For primary bibliographic entry see Field 5A.
W75-04100

THE USE OF AN AUTOMATED POPULATION DATA BASE IN POPULATION EXPOSURE CALCULATIONS,
Office of Radiation Programs, Silver Spring, Md. Electromaganetic Radiation Analysis Branch.
For primary bibliographic entry see Field 5A.
W75-04157

CONDOS-A MODEL AND COMPUTER CODE TO ESTIMATE POPULATION AND INDIVIDUAL RADIATION DOSES TO MAN FROM THE DISTRIBUTION, USE AND DISPOSAL OF CONSUMER PRODUCTS THAT CONTAIN RADIOACTIVE MATERIALS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
W75-04182

COOLING POND TEMPERATURE PREDICTION,
Towson State Coll., Baltimore, Md. Dept. of Computer Science.
For primary bibliographic entry see Field 5B.
W75-04222

DATA COLLECTION AND ANALYSIS TECHNIQUES FOR GLOBAL MARINE POLLUTION STUDIES,
Department of the Environment, Ottawa, (Ontario). Marine Sciences Directorate.
For primary bibliographic entry see Field 5A.
W75-04236

RELATIONSHIP BETWEEN LIMNOLOGICAL CONDITIONS OF RESERVOIRS AND WATERSHED FEATURES - A SURVEY,
Ministry of Public Works, Madrid (Spain). Section of Sedimentation and Natural Pollution.
For primary bibliographic entry see Field 2H.
W75-04244

CLASSICAL CANAL THEORY WITH GRAPHS AND TABLES. VOLUME II,
Hawaii Inst. of Geophysics, Honolulu.
For primary bibliographic entry see Field 8B.
W75-04270

MARINE STUDIES OF SAN PEDRO BAY, CALIFORNIA, PART V; DATA REPORT, TEMPERATURE, SALINITY, OXYGEN AND HYDROGEN ION CONCENTRATION IN OUTER LOS ANGELES HARBOR, JUNE 1971 TO NOVEMBER 1973.
Southern California, University of Los Angeles. Sea Grant Program.
For primary bibliographic entry see Field 5B.
W75-04272

SURFACE WATER DATA OF THE UPPER MICHIGAN REGION PROJECT SANGUINE, SITE STUDY.
EDAW, Inc., San Francisco, Calif.
For primary bibliographic entry see Field 2E.
W75-04277

IDENTIFICATION OF A DISTRIBUTED PARAMETER SYSTEM IN HYDROLOGY,
California Univ., Berkeley. Operations Research Center.
For primary bibliographic entry see Field 2F.
W75-04280

A METHOD FOR MAINTAINING CROSS AND SERIAL CORRELATIONS AND THE COEFFICIENT OF SKEWNESS UNDER GENERATION IN A LINEAR BIVARIATE REGRESSION MODEL,
Tahal Consulting Engineers Ltd., Tel Aviv (Israel). Dept. of Research, Development and Planning.
For primary bibliographic entry see Field 2E.
W75-04309

CRE: A METHOD FOR SOLVING PROBABILITY PROBLEMS RELATED TO HYDROLOGIC TIME SERIES,
Idrotecneco, San Lorenzo in Campo, (Italy).
For primary bibliographic entry see Field 2E.
W75-04310

8. ENGINEERING WORKS

8A. Structures

SELF-CLEANING FILTER FOR HYDROLOGICAL REGENERATION,
For primary bibliographic entry see Field 5D.
W75-03864

DAM BUILDING SYSTEM,
G. L. Malan.
U.S. Patent No 3,845,631, 6 p, 5 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 928, No 1, p 55, November 5, 1974.

Descriptors: *Patents, *Dams, *Concrete dams, *Dam construction, Equipment, Water control, Construction, Engineering structures, Concrete structures.

A pool is formed upstream of the dam site; a floating platform bearing a concrete mixing plant is placed in the pool; and concrete is discharged from the mixing plant at a placement site on the damsite so as to build the dam and to increase its height. The pool is permitted to deepen as the dam rises so that the mixing plant approximately rises with the dam, whereby the concrete is mixed at a location relatively close to a placement site. The floating platform may be supported on pontoons which may be connected to pumps which can variably flood or evacuate them so as to change elevation of the platform relative to the surface of the pool. A means is provided for the safe and closely coupled mixing and placement of concrete on a dam. The requirement for conventional cableways with all of their inconveniences and risks is eliminated, and a mixing plant can be placed only a few feet away from the actual placement site. The mixing plant can conveniently be moved back and forth laterally along the upstream face of the dam. The materials of construction can handily be supplied to the mixing plant and can be kept cool, both in storage and on their way to the mixing plant. (Sinha-OEIS)
W75-03873

PNEUMATIC BARRIERS TO REDUCE SALT INTRUSION THROUGH LOCKS,
Waterloopkundig Laboratorium, Delft (Netherlands). Density Currents Branch.
G. Abraham, P. van der Burgh, and P. de Vos.
Rijkswaterstaat Communications, No. 17, Government Publishing Office, The Hague, The Netherlands, 1973. 68 p, 21 fig, 3 tab, 15 photo, 79 equ, 18 ref.

Descriptors: *Saline water intrusion, *Locks, *Canals, Hydrodynamics, Hydraulics, Sea water, Fresh water, Evaluation, Design criteria, Ships, Water quality control, *Saline water barriers, *Barriers.
Identifiers: *Pneumatic barriers, North Sea(The Netherlands).

In the Netherlands, salt intrusion through locks on the coast is a serious threat to the water quality in the 'collector' canals linked with the locks. The various means of controlling sea water intrusion through locks are evaluated. The mechanism of salt intrusion through the lock is examined; considered are intrusion due to equalization of levels, the pattern produced when lock gates separating saline and fresh water are opened, and the effect of displacement of ships. After briefly considering current practices in the Netherlands, the hydrodynamics of pneumatic barriers are discussed. Described are a continuity equation, a momentum equation, and a mathematical solution. Design criteria for pneumatic barriers in locks are examined and their upkeep is explained. Among the measures of reducing salt intrusion, the exchange of salt water for fresh water while the lock gates are closed is the most effective (and most expensive) method. Pneumatic barriers constitute a simple, convenient and cheap method, which will not keep out all the salt but will reduce intrusion considerably. The pneumatic barrier method of preventing salt intrusion is suitable for practically all the locks adjoining the sea in the Netherlands. Measures for new locks should be considered for each case individually. Pneumatic barriers can be combined with alternative means. (Bell-Cornell)
W75-03920

SOME HYDRODYNAMICAL ASPECTS OF GRAVITY-TYPE PLATFORM DESIGN,
Waterloopkundig Laboratorium, Delft (Netherlands).
For primary bibliographic entry see Field 8B.
W75-03924

DESIGN OF A CONDUIT SYSTEM WITH DIVERGING BRANCHES,
North Carolina State Univ., Raleigh. Dept. of Agricultural Engineering.
K-P. Yang, T. Liang, and I-P. Wu.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 101, No. HY1, Proceedings paper No. 11080, p 167-188, January 1975. 12 fig, 3 tab, 31 equ, 16 ref.

Descriptors: Hydraulics, *Pipelines, *Pumping, *Water distribution(Applied), *Dynamic programming, *Conduits, Design, Computer programs, Irrigation, Transmission lines, Optimization, Costs, Methodology, Networks, Systems analysis, Equations, Computer models, Flow.
Identifiers: Systems engineering.

The capability of a dynamic programming conduit design technique has been expanded to cover systems with diverging branch pipelines. An interactive computer programming approach is used in the optimization design. Design applies to complete turbulent, transient, as well as laminar, flow conditions. The decision variable, pipe size, assumes only pipe sizes that are available on the market. The sum of all cost phases, which includes pipe material cost, power cost, and wasted water cost, is used as a criterion for measuring the overall system effectiveness. The interactive approach, as opposed to the previously-used batch process, proves to be superior in the flexibility of allowing human decision and in the reduction of computation time. This expansion of the prior calculation method has been used successfully many times in solving different problems. It can handle various diverging branch type fluid networks; moreover, the dynamic programming technique is applicable to analysis and design of a more complex water system. (Bell-Cornell)
W75-03930

SOME CHARACTERISTICS OF COUNTERJET FLOW,
Sir George Williams Univ., Montreal (Quebec).
For primary bibliographic entry see Field 5B.
W75-04217

DRY-TYPE COOLING SYSTEMS IN ELECTRIC POWER PRODUCTION,
North Dakota State Univ., Fargo. Dept. of Mechanical Engineering.
For primary bibliographic entry see Field 5D.
W75-04221

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING, THE CLARION RIVER BASIN, PENNSYLVANIA.
Federal Power Commission, Washington, D.C. Bureau of Power.
For primary bibliographic entry see Field 6G.
W75-04274

8B. Hydraulics

METHOD AND APPARATUS FOR BREAKING WAVES,
M. L. Edwards.
US Patent No 2,851,476, 5 p, 6 fig, 4 ref; Official Gazette of the United States Patent Office, Vol 929, No 1, p 58, December 3, 1974.

Descriptors: *Patents, *Shore protection, *Beach erosion, *Breakwaters, Waves(Water), Beaches, Coastal structures.
Identifiers: *Wave action.

The base of an artificial shore machine is anchored to the bed or floor near the shore of the body of water to be controlled. The anchor is any conventional anchorage means, such as legs or posts which penetrate into the sea floor to maintain the base in position. The shore machine may be supported at the desired depth by attachment to a ship, a barge, or other convenient float, and may thus also be used quite far from shore. A relatively flat platform is attached to the base by means of a hinge along the side of the base closest to the incoming waves, and generally most distant from the shore. The end of the platform away from the approaching waves is then free to move on the hinge upward and downward to vary the slope of the platform and the height of the edge of the platform away from the waves (nearest the shore). A double acting hydraulic cylinder is connected between the base and the platform to move the platform up and down relative to the base, in controlled fashion. The hydraulic cylinder is remotely controlled by means of hydraulic oil lines connected to a conveniently located remote control station on the shore or on board a ship (or barge) near the machine. The machine thus artificially induces waves to break in a controllable fashion, at an earlier time, and at a generally fixed location farther from shore, than would otherwise occur. (Sinha-OEIS)
W75-03868

DEVICE FOR PRODUCING AND PROTECTING DEPOSITS OF SEDIMENTARY MATERIAL ON THE FLOOR OF BODIES OF WATER,
O. J. F. Larsen.
U.S. Patent No 3,844,123, 5 p, 22 fig, 2 ref; Official Gazette of the United States Patent Office, Vol 927, No 5, p 1838, October 29, 1974.

Descriptors: *Patents, *Shore protection, *Beach erosion, Equipment, Erosion, Deposition, Sands, Littoral drift, Sand bars, Sediment control.
Identifiers: *Wave action, Offshore bars.

A device is described for deposition and protecting sand and other littoral drift material on the floors of seas, lakes, rivers and other bodies of water where the bed and sides consist of erosionable material. The device is placed at a certain level above the floor, thereby allowing for a height of the deposition underneath the device greater than corresponding to the height of the device itself. Plane or curved, flexible or stiff-plate-like members are disposed to form a surface in upwardly spaced relation to and generally parallel to the floor. The waves and currents thereby loose a part of the material drifting underneath this surface. The consequent deposition of material is protected by the depositing device against scouring. The plate-like members may form a continuous, flexible carpet or stiff plate, or individual, interspaced elements. Where the purpose is creation of offshore bars for coastal protection and reforming, the device is raised according as deposition of the drift material takes place, so that one layer of material is precipitated on top of the other until the required height is reached. (Sinha-OEIS)
W75-03871

TRANSVERSE MIXING IN RIVERS; A NUMERICAL APPROACH,
Waterloopkundig Laboratorium, Delft (Netherlands). Mathematics Branch.
G. K. Verboom.
Reprint paper from: The XVth IAHR Congress, Istanbul, September 2-7, 1973. Publication No. 117, Delft Hydraulics Laboratory, the Netherlands, March 1974. 14 p, 5 fig, 1 tab, 10 equ, 4 ref, 1 append.

Descriptors: *Rivers, *Mixing, Hydraulics, *Numerical analysis, Concentration, Measurement, Downstream, Upstream, Model studies, Simulation analysis, Advection, Diffusion, Dispersion, Flow, Velocity, Channels, Equations, Systems analysis.
Identifiers: *Transverse mixing, *Conservation equation, *Finite-difference method, Transverse dispersion coefficient, IJssel River(Netherlands), Non-buoyant material, Discharged material.

To study the transverse mixing in rivers numerically, the conservation equation of the released material is solved, using a fourth order accurate finite-difference method that has small numerical diffusion and dispersion. After preliminary computations to study the accuracy of the results, the concentration is calculated of a conservative, non-buoyant material released into a model of a river. From concentration measurements in this model and other characteristic features of the stream, Holley calculated the transverse dispersion coefficient with the general change of momentum method. Herein, this coefficient is used to find the concentration distribution. The agreement is quite satisfactory, giving support to the numerical method as well as to the analytical method by which the dispersion coefficient was found. (Bell-Cornell)
W75-03917

MODEL-PROTOTYPE COMPARISONS FOR TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
E. R. Holley, and M. Karelse.
Reprint paper from: XVth IAHR Congress, Istanbul, September 2-7, 1974. Delft Hydraulics Laboratory, Publication No. 116, The Netherlands, March 1974. 12 p, 2 fig, 1 tab, 6 equ, 13 ref.

Descriptors: *Rivers, Hydraulics, *Model studies, *Streamflow, *Mixing, Downstream, Discharge(Water), Measurement, Depth, Velocity, Turbulence, Diffusion, Effluents, Water quality, Equations, Systems analysis.
Identifiers: *Transverse mixing, Longitudinal mixing, Concentration distribution.

The problem under consideration is transverse mixing downstream from an outfall discharging at a steady rate into a river. It is assumed that: (1) the material being injected is conservative; (2) depth-averaged values can be used so that only the transverse and longitudinal variations of the quantities of interest need to be considered; and (3) longitudinal mixing can be neglected for the steady state concentration distribution. Analytical considerations are reviewed relative to the model reproduction of the mixing process. An undistorted model can correctly reproduce the transverse diffusion in the prototype, but the diffusion in a distorted model will be too great relative to the prototype. Comparisons of model and prototype concentration measurements are presented for an undistorted model of one river and for a distorted model of another river. These data comparisons substantiate the previous statements about the reproduction of diffusion. If diffusion is a significant mechanism in the process to be studied, a distorted hydraulic model should not be used. (Bell-Cornell)
W75-03918

DIGGING IN OF ANCHORS INTO THE BOTTOM OF THE NORTH SEA,
Waterloopkundig Laboratorium, Delft (Netherlands).
J. Koster.
Publication No. 129, The Delft Hydraulics Laboratory, The Netherlands, June 1974. 17 p, 2 fig, 7 photos, 1 tab, 62 ref.

Descriptors: *Anchors, *Hydraulics, *Pipelines, *Bibliographies, Depth, Damages, Data collections, Ships.
Identifiers: *North Sea(Netherlands), *Ocean floor, Depth of penetration.

Oil or gas pipelines are expected to be laid on the Dutch section of the bottom of the North Sea. Utmost care will have to be taken to keep these pipelines from leaking. Damages to dug in pipelines, apart from those caused by bottom fluctuations, may be caused also by anchors caught behind the pipeline. This can be prevented by applying on the pipeline a top layer of ground which is thicker than the depth to which the anchor digs

into the bottom (penetration depth). To study the possible digging in of anchors, a literature review was made. This report includes a list of all known literature relating to ships' anchors and a discussion of data taken from the literature. The summary of information is restricted to types of anchors that dig in without outside help or the use of explosives. Considered are: (1) ships' anchors, including stock, stockless, and non-stockless patent anchors; and (2) work anchors, including various patent anchors. The behavior of the various types of anchor in sandy, clay, and muddy bottoms is examined. (Bell-Cornell)
W75-03919

PNEUMATIC BARRIERS TO REDUCE SALT INTRUSION THROUGH LOCKS,
Waterloopkundig Laboratorium, Delft (Netherlands). Density Currents Branch.
For primary bibliographic entry see Field 8A.
W75-03920

SOME HYDRODYNAMICAL ASPECTS OF GRAVITY-TYPE PLATFORM DESIGN,
Waterloopkundig Laboratorium, Delft (Netherlands).
J. van der Weide.
Reprint from: Paper presented at Inter Ocean '73, Dusseldorf, November 13-18, 1973. Delft Hydraulics Laboratory, Publication No. 120, March 1974. 15 p, 12 fig, 26 equ, 8 ref.

Descriptors: Hydraulics, *Hydrodynamics, *Waves, *Design data, Caissons, Stability, Depth, Height, Deep water, Shallow water, Piles(Foundations), Gravity, Equations, Methodology.
Identifiers: *Platform design, *Wave forces, *Design graphs, Production platforms, Spectral analysis.

In recent years, the concept of gravity-type production platforms has been introduced as an alternative to the traditional pile-supported platforms. For the design of these structures, wave forces under design conditions are of primary importance. Available techniques to obtain these forces are reviewed. Design graphs are given to facilitate the determination of wave forces on large objects, such as caissons for gravity-type structures. From the graphs, the wave loads in both regular and irregular waves can be computed. Horizontal forces for piles with both square and circular cross-sections, as obtained from the graphs, are in good agreement with values measured in model experiments. Results are valid for conditions where the wave profile can be approximated by the first order wave theory, which implies waves of moderate steepness in relatively deep water. When computing forces due to shallow water waves, the results obtained from the graphs may be used as a first approximation. Model tests with the final design are recommended to check the preliminary design data obtained from the graphs. (Bell-Cornell)
W75-03924

STOPPING DISTANCES OF V.L.C.C. IN IJMUIDEN,
Waterloopkundig Laboratorium, Delft (Netherlands).
J. Koster.
Reprint from: De Nederlandse Loods, 16e jaargang, No. 3, June 1974. Publication No. 123, Delft Hydraulics Laboratory, The Netherlands, March 1974. 10 p, 7 fig, 3 ref.

Descriptors: *Ships, *Harbors, *Measurement, Velocity, Distance, Simulation analysis, Equations, Experiments, Data collections, *Hydraulics, Resistance.
Identifiers: *Stopping maneuver, Stopping length, Tugboats, Speed, Amsterdam(The Netherlands), IJmuiden(The Netherlands).

As long as the dimensions of ships have been growing, the discussion about stopping distances of giant vessels has taken place. Especially in harbors, the stopping maneuver is worth a separate study, since the available stopping length is limited and a minimum velocity is required in order to enter the harbor safely. Much data are available about the stopping maneuver under the conditions of crash-stop trials at high sea. However, conditions in harbors are different; they are characterized by confined water (in depth and width), low speeds, tug assistance and maneuvers with rudder and propeller to keep course. For this reason, the existing computational methods to determine the stopping length at high sea have been adapted for application in harbors. The computation can determine the required stopping length under severe conditions, when tests are unwarranted. Some prototype measurements have been carried out to calibrate this new computational method. Measurements were made in the harbor of IJmuiden, where several extensions to sluices and breakwaters are making the entrance route rather complicated. (Janet Bell-Cornell)
W75-03925

LINEAR WAVE PROPAGATION PROBLEMS AND THE FINITE ELEMENT METHOD,
Waterloopkundig Laboratorium, Delft (Netherlands). Mathematics Branch.
J. C. W. Berkhoff.
Reprint paper from: The International Symposium on Finite Element Methods in Flow Problems, Swansea, January 7-11, 1974. Publication No. 124, Delft Hydraulics Laboratory, March 1974. 29 p, 19 fig, 81 equ, 13 ref.

Descriptors: Hydraulics, *Waves(Water), *Model studies, *Finite element analysis, Equations, Structures, Harbors, Refraction(Water waves), Computers, Systems analysis.
Identifiers: *Linear wave propagation, *Harmonic linear waves, *Wave forces.

Mathematical models for the computation of water wave propagation problems restricted to simple harmonic linear, irrotational waves have been developed during the past ten years in the field of wave forces on structures, harbor oscillations, diffraction, refraction and the combined phenomenon of refraction and diffraction. A survey is presented of these modeling techniques for which the numerical treatment can be classified as finite element analysis. Described are the mathematical formulation, the methods of solution, and the relation between the different models. The models yield quantitative or qualitative information concerning the effect of waves on structures or harbors. The main restriction of these models is the numerical requirement of about five computing points over one wave length to compute the potential function with an accuracy of roughly five percent. For the combined refraction-diffraction model, this requirement is a rigid one with respect to computing time and computer memory in the case of a large area compared with the mean wave length. However, it is possible to divide the whole area of interest into subareas for which different models can be applied and to join the different solutions in an appropriate way. (Bell-Cornell)
W75-03926

EXPERIENCES WITH TIDAL SALINITY MODEL EUROPOORT,
Delta Works, The Hague (Netherlands). Hydraulics Div.; and Waterloopkundig Laboratorium, Delft (Netherlands).
A. J. van Rees, P. van der Kuur, and H. J. Stroband.
Reprint paper from: The 13th International Conference on Coastal Engineering, Vancouver, Canada, July 10-14, 1972. Publication No. 125, Delft Hydraulics Laboratory, June 1974. 21 p, 8 fig, 4 ref.

Descriptors: *Coastal engineering, *Hydraulic models, *Tides, *harbors, Simulation analysis, Water level, Salinity, Dispersion, Silts, Rivers, Currents(Water), Data collections, Research, Density currents, Estuaries, Mathematical models, Systems analysis, Flow.
Identifiers: *Shipping, Seaports, North Sea(The Netherlands), Rotterdam Waterway Estuary(The Netherlands), Water transportation, Tidal movements.

A tidal salinity model for the harbor entrance at Rotterdam-Europoort was constructed in 1965. Described in detail are the preliminary studies, the setting up of the model, the boundary conditions, and use of the model in experimental studies. The model includes a part of the North Sea and the Rotterdam Waterway Estuary. For its regular adjustment, use could be made of extensive prototype measurements, two-dimensional tidal computations and tidal computations by means of the DELTAR (analogue, one-dim.). The model has proved to be very valuable for predicting stream patterns for nautical purposes, allowing shipping to continue without danger while the works were being carried out. The model has been used also for the solution of harbor problems (design, siltation), for predicting cooling water recirculation, and for advice on salinity intrusion problems. (Bell-Cornell)
W75-03927

LABORATORY STUDIES ON TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
E. R. Holley, and G. Abraham.
Reprint from Journal of Hydraulic Research, Vol 11, No 3, 1973. Publication No. 127, Delft Hydraulics Laboratory, The Netherlands, June 1974. 35 p, 12 fig, 2 tab, 7 equ, 8 ref.

Descriptors: *Rivers, *Streams, *Mixing, Hydraulics, *Simulation analysis, *Laboratory tests, Analytical techniques, Least squares analysis, Equations, Model studies, Flow, Tracers, Channels, Depth, Velocity, Concentration, Flumes, Width, Experiments, Data collections, Systems analysis.
Identifiers: *Transverse mixing, *Lateral dispersion, IJssel River(Netherlands), Bed-shear turbulence, Groins, Bends, Helical motion, Chezy coefficients, Displacement, Non-buoyant tracers.

Described are some laboratory studies made with non-buoyant tracers to investigate the mixing under simulated stream conditions and the possible significance of mechanisms which are in addition to bed-shear turbulence and which contribute to the transverse mixing. Experiments were conducted for (1) a straight rectangular flume with simulated groins, and (2) an undistorted, fixed bed river model with groins. The flows considered are characterized by (1) variations in depth and width, (2) extra side roughness, as protective works (groins) are present, and (3) bends. As a result of these characteristics, the transverse spreading of a non-buoyant tracer is influenced by: (1) turbulence, which may be non-uniformly distributed as a result of side roughness; (2) helical motion associated with channel bends; and (3) net transverse velocities. Transverse velocities from changes in channel geometry cause transverse displacements of the tracer plume. The displacement must be considered when using measured distributions of tracer concentrations to study transverse mixing; the applicability of a method of doing so is demonstrated. The transverse mixing problem can be treated using a transverse dispersion coefficient. The generalized change of moments method of analysis using data obtained for a simulated river is useful in showing some consistency in data which appeared to be inconsistent based on the traditional change of moments analysis. (Bell-Cornell)
W75-03928

WATER FOR THE HUMAN ENVIRONMENT, VOLUME IV, SPECIAL SESSIONS.
For primary bibliographic entry see Field 5B.
W75-04213

DESIGN AND MODEL TESTS OF THERMAL DISCHARGE DIFFUSERS,
Sudesco Systems, Inc., Buffalo, N.Y.
J. A. Tallis.
In: Water For The Human Environment, Volume IV, Special Sessions; Proceedings of the First World Congress on Water Resources (4 Vol.), Chicago, Illinois, September 24-28, 1973. International Water Resources Association, Business Office, 425 Illinois Building, Champaign, Illinois, p 48-61. 3 fig, 6 ref.

Descriptors: *Model studies, *Thermal water, *Froude number, *Hydraulic models, *Hydraulic structures, *Lake Ontario, Mixing, Jets, Dispersion, Turbulence, Momentum transfer, Entrainment, Harbors, Waste dilution, Discharge(Water).
Identifiers: *Diffusers, Densimetric Froude number, Thermal discharge.

Two specific aspects of thermal hydraulic model simulation were described. The results obtained from the study of a particular thermal discharge are applicable to other design situations. The use of an undistorted, two-dimensional model for investigating in detail the flow and mixing characteristics of a thermal discharge diffuser was discussed. Methods for calibrating distorted scale models to provide satisfactory prototype simulation were detailed. Guidelines for the initial design of a diffuser structure were presented. (See also W75-04213) (Bhowmik-ISWS)
W75-04216

SOME RESULTS FROM EXPERIMENTAL DATA ON SURFACE JET DISCHARGE OF HEATED WATER,
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
For primary bibliographic entry see Field 5B.
W75-04220

DESIGN OF THERMAL COOLING SYSTEMS USING THE CASCADE OF ENERGY CONCEPT,
Oklahoma Univ., Norman. Dept. of Aerospace, Mechanical and Nuclear Engineering.
For primary bibliographic entry see Field 5D.
W75-04228

REVIEW OF HEATED SURFACE DISCHARGE MODELS APPLICABLE TO RIVERS,
Vanderbilt Univ., Nashville, Tenn. Dept. of Environmental and Water Resources Engineering.
For primary bibliographic entry see Field 5B.
W75-04229

THE TRIANGLE AS A TENTATIVE UNIT HYDROGRAPH,
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W75-04239

A DOUBLE-TRIANGLE MODEL FOR GENERATING STORM HYDROGRAPHS,
Tennessee Valley Authority, Knoxville, Tenn. Hydrologic Research and Analysis Office.
For primary bibliographic entry see Field 4A.
W75-04241

CLASSIC CANAL THEORY WITH GRAPHS AND TABLES. VOLUME I,
Hawaii Inst. of Geophysics, Honolulu.
R. W. Preisendorfer, and F. I. Gonzalez, Jr.
Available from the National Technical Information Service, Springfield, Va 22161 as COM-74-10875, $8.75 in paper copy, $2.25 in microfiche. Report No. NOAA-74040402, August 1973. 284 p, 3 tab, 107 ref. NSF-AG-253.

Descriptors: *Hydrodynamics, *Seiches, *Canals, *Theoretical analysis, *Mathematical studies, Resonance, Networks, Waves(Water), Surface waters, Mathematics.
Identifiers: *Canal theory, *Linear transport theory, *Radiative transfer theory, *Boundary value problems, Wave propagation.

The practical problems of linear surface-wave transport in nonuniform canals reduce principally to four main types: general responses to external and internal sources, seiches, resonances, and network problems. In each type of problem the geometry and physical parameters of the canals were given, and it was required to predict the time dependent or steady state (time-harmonic) wave amplitudes within the canals. These problems were reformulated for the time-harmonic case by using the concepts and methods of linear transport theory as they have been developed principally in the neighboring fields of geophysical radiative transfer theory and electric network theory. By applying the transport ideas of these two fields to classic canal theory, new mathematical and numerical procedures were developed in each of the four main problem domains. The mathematical procedures themselves fall into four classes: analytic, algebraic, product and quotient functionals, and inter-relations among these classes. The applications were summarized and illustrated by means of a selected set of graphs. Detailed comparisons between the present approach and the classic approach were made. (See also W75-04270) (Humphreys-ISWS)
W75-04269

CLASSICAL CANAL THEORY WITH GRAPHS AND TABLES. VOLUME II,
Hawaii Inst. of Geophysics, Honolulu.
R. W. Preisendorfer, and F. I. Gonzalez, Jr.
Available from the National Technical Information Service, Springfield, Va 22161 as COM-74-10876, $9.50 in paper copy, $2.25 in microfiche. Report No. NOAA-74040403, August 1973. 341 p, 243 fig. NSF-AG-253.

Descriptors: *Data collections, *Curves, Hydrodynamics, Seiches, Canals, Waves(Water), Surface waters, Resonance.
Identifiers: *Canal theory, Wave propagation, International Decade of Ocean Exploration.

This volume contains the graphs and data tabulations prepared in connection with Volume I. (See W75-04269) (Humphreys-ISWS)
W75-04270

OPEN CHANNEL FLOW EVAPORATION STUDY,
Bonneville Power Administration, Portland, Oreg.
For primary bibliographic entry see Field 2D.
W75-04273

HYDRODYNAMIC EFFECTS OF OIL SLICK MECHANICAL CONTROL DEVICES,
Texas A and M Research Foundation, College Station.
For primary bibliographic entry see Field 5G.
W75-04327

HEAT DISSIPATION FROM TURBULENT OPEN CHANNEL FLOW,
Georgia Inst. of Tech., Atlanta. School of Civil Engineering.
For primary bibliographic entry see Field 5B.
W75-04350

8C. Hydraulic Machinery

MEANS FOR ROTATABLY SUPPORTING AN OVERHEAD IRRIGATION PIPE,
Lindsay Mfg. Co., Nebr. (assignee)
For primary bibliographic entry see Field 3F.
W75-03867

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING, THE CLARION RIVER BASIN, PENNSYLVANIA.
Federal Power Commission, Washington, D.C. Bureau of Power.
For primary bibliographic entry see Field 6G.
W75-04274

8D. Soil Mechanics

REGIONAL LANDFILL AND CONSTRUCTION MATERIAL NEEDS IN TERMS OF DREDGED MATERIAL CHARACTERISTICS AND AVAILABILITY; VOLUME I: MAIN TEXT,
Green Associates, Inc., Towson, Md.
For primary bibliographic entry see Field 5G.
W75-04266

8F. Concrete

DAM BUILDING SYSTEM,
For primary bibliographic entry see Field 8A.
W75-03873

DETERIORATION OF CONCRETE DITCH LINERS IN SALINE-ALKALI SOIL,
Agricultural Research Service, Brawley, Calif. Imperial Valley Conservation Research Center.
L. B. Grass, and P. Koluvek.
Journal of the Irrigaion and Drainage Division, Proceedings of the American Society of Civil Engineers. Vol. 100, No. IR4, December, 1974. p 477-484, 3 fig, 2 tab, 10 ref.

Descriptors: *Irrigation ditches *Salinity, *Concrete-lined canals, *Deterioration, *Chemical degradation, berms, Saline Soils, Soil moisture, Calcium, Sodium, Heating, Cracks, Stress, Arid Lands, Solar radiation, *California.

Deterioration of portland cement concrete ditch liners has been noted in Imperial Valley, California. Deterioration has taken place in less than 10 years in some cases and is most severe on the north slope of east-west ditches and the east slope of north-south oriented ditches. Both chemical and physical reactions are responsible for the gradual softening of the concrete ditch liners. Cracking is due to the differences in temperature above and below the water level which accelerates chemical corrosion by continually exposing new surfaces. The most rapid and severe deterioration occurs at the top of the liner and decreases toward the bottom of the ditch, as saline solutions (particularly sodium and calcium) migrate from the soil by capillarity into the concrete mass. As water enters a heated ditch stresses are created by differential temperatures above and below the water lines, and the liner, already weakened by chemical stresses, will crack. This accounts for greater damages to the slopes exposed to maximum sunlight and heat. The problem can be avoided by interrupting the flow of moisture into the concrete. This can be done by using a more dense concrete mass having a lower porosity, by scheduling water application during the cooler part of the day to avoid undue stress, and using a soil low in salt content when building the berm. (Mastic-Arizona)
W75-03966

8G. Materials

IRRIGATION DITCH LINER AND METHOD FOR MAKING SAME,
For primary bibliographic entry see Field 4A.
W75-03863

REGIONAL LANDFILL AND CONSTRUCTION MATERIAL NEEDS IN TERMS OF DREDGED MATERIAL CHARACTERISTICS AND AVAILABILITY; VOLUME I: MAIN TEXT,
Green Associates, Inc., Towson, Md.
For primary bibliographic entry see Field 05G.
W75-04266

10. SCIENTIFIC AND TECHNICAL INFORMATION

10A. Acquisition And Processing

SETTING UP A SPECIAL COLLECTION ON WATER POLLUTION IN A UNIVERSITY LIBRARY,
Case Western Reserve Univ., Cleveland, Ohio. Sears Library.
For primary bibliographic entry see Field 05G.
W75-04118

10D. Specialized Information Center Services

SETTING UP A SPECIAL COLLECTION ON WATER POLLUTION IN A UNIVERSITY LIBRARY,
Case Western Reserve Univ., Cleveland, Ohio. Sears Library.
For primary bibliographic entry see Field 05G.
W75-04118

10F. Preparation Of Reviews

EFFECTS OF TEMPERATURE ON THE TOXICITY TO THE AQUATIC BIOTA OF WASTE DISCHARGES-A COMPILATION OF THE LITERATURE,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 05C.
W75-03854

STANDARDS, ADMINISTRATION, AND SURVEYS, (LITERATURE REVIEW),
Delaware River Basin Commission, Trenton, N.J.
For primary bibliographic entry see Field 05G.
W75-04014

SOLID WASTE AND WATER QUALITY, (LITERATURE REVIEW),
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
For primary bibliographic entry see Field 05B.
W75-04016

MICROBIOLOGY OF WASTE TREATMENT, (LITERATURE REVIEW),
Pennsylvania State Univ., University Park.
For primary bibliographic entry see Field 05D.
W75-04117

WASTEWATER TREATMENT, PHYSICAL AND CHEMICAL METHODS, (LITERATURE REVIEW),
Massachusetts Univ., Amherst. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05D.
W75-04121

SUBJECT INDEX

ABSORPTION
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

ACCELERATORS
Population Exposure from High-Energy Accelerators,
W75-04183 5C

ACCIDENTS
An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

ACCRETION (LEGAL ASPECTS)
Wineman v. Shannon Brothers Lumber Co., Inc. (Action Between Coterminous Riparian Landowners to Determine Accretion Apportionment).
W75-03994 6E

ACID MINE WATER
Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

Courts Back State's Power to Halt Acid Mine Drainage,
W75-04301 5G

ACIDIC SOILS
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

ACIDIFICATION
Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

ACTIVATED CARBON
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

ACTIVATED SLUDGE
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

ADJUDICATION PROCEDURE
Minnesota Public Interest Research Group V. Butz (Action for Injunctions Against Logging in Boundary Waters Canoe Area).
W75-04293 6E

Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

ADMINISTRATION
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

ADMINISTRATIVE AGENCIES
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

Scattering Fork Drainage District, County of Douglas v. Ogilvie (Suit Challenging Legality of Proposed Consruction of Water Reservoir Project).
W75-04008 6E

ADMINISTRATIVE DECISIONS
Minnesota Public Interest Research Group V. Butz (Action for Injunctions Against Logging in Boundary Waters Canoe Area).
W75-04293 6E

ADMINISTRATIVE REGULATIONS
Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

Non-Transportation Oil Spill Regulations.
W75-04303 5G

ADOPTION OF PRACTICES
Biderman V. Morton (Seeking Injunction to Restrain Construction on Fire Island Pending Environmental Impact Statement).
W75-04291 6E

ADSORPTION
Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

Soil Adsorption of Humic Color,
W75-04043 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

Models of Dispersion in a Granular Medium,
W75-04340 2F

AEDES SOLLICITANS
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

AERATED LAGOONS
Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

AERATION
Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

AERATORS
Liquid Aerating Apparatus,
W75-03875 5D

AERIAL PHOTOGRAPHY
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

AEROSOLS
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

AEROSOLS

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

AERSOLS
Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

AFRICA
A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

AGE EFFECT
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

AGRICULTURE
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

AGRO-INFORMATION
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

AIR DRYING
Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

AIR ENTRAINMENT
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

AIR POLLUTION
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

Accumulation of Strontium-90 in Soils,
W75-04062 5B

Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

ALABAMA
Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

ALASKA
Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska,
W75-04314 2G

ALBEDO
The Three Stages of Drying A Field Soil,
W75-03965 2D

ALGAE
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

Effect of Turbidity on Algal Growth,
W75-04306 5C

ALGAL CONTROL
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

ALGAL SPECIES SUCCESSION
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

ALGORITHMS
CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

ALLUVIAL CHANNELS
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

ALPINE SOILS
Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska,
W75-04314 2G

ALTAHAMA GEORGIA SOUTHERN AREA
Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

ALTERNATIVE WATER USE
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

AMBIENT CURRENT EFFECTS
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

AMMONIUM CHLORIDE
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

AMMONIUM SALTS
Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

ANAEROBIC CONDITIONS
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

ANAEROBIC DIGESTION
Mixing in Anaerobic Digestion,
W75-04120 5D

ANALOG MODELS
Application of Analog Techniques to Water Management,
W75-04202 6A

ANALYTICAL TECHNIQUES
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

ANCHORS
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

ANIMAL GROUPINGS
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

ANOPHELES MOSQUITOES
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

APPROXIMATE PROBABILITY DENSITY FUNCTION
The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

AQUACULTURE
Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

AQUATIC ENVIRONMENT
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

AQUATIC HABITATS
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

AQUATIC MICROBIOLOGY
Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

AQUIFER MANAGEMENT
Application of Analog Techniques to Water Management,
W75-04202 6A

AQUIFER SYSTEMS
Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

AQUIFERS
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

ARCHAEOLOGY
Irrigation's Impact on Society.
W75-04138 3F

ARGON
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

ARID CLIMATES
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

ARID LANDS
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

ARIZONA
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

The Three Stages of Drying A Field Soil,
W75-03965 2D

Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

ARIZONA INDIANS
Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

ARKANSAS RIVER PROJECT
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

ARTESIAN AQUIFERS
Application of Analog Techniques to Water Management,
W75-04202 6A

ASBESTOS
Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

ASCOMYCETE
The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

ASSAY
Horizontal Water Migration of Strontium-90,
W75-04066 5B

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

ASSESSMENT
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

ASSESSMENTS
Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

ATLANTIC OCEAN
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

ATLANTIC SALMON
Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

ATMOSPHERE
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

ATMOSPHERIC FALLOUT
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

ATOMIC ABSORPTION
Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

AUSTRALIA
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

AUTOMATION
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

BACKGROUND RADIATION
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

BACTERIAL CELLS
Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

BACTERICIDES
Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

BALDWIN LAKE (CALIF)
Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

BARLEY
Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

BARRIERS
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

BARSTOW (CALIF)
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

BASE FLOW
Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

BASELINE STUDIES
Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

BASIC DATA COLLECTION
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

BASIC DATA COLLECTIONS
Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

BEACH EROSION
Method and Apparatus for Breaking Waves,
W75-03868 8B

Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water,
W75-03871 8B

BEETLE-INFESTED WATERSHEDS
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

BEHAVIOR
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

BEIDELLITE
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

BELGIUM
Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

BENEFITS
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

BENTHIC MACROINVERTEBRATES
Rejuvenation of the Buffalo River,
W75-04248 5C

BENTHOS
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

BENZENE COMPOUNDS
Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

BERYLLIUM
Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

BIBLIOGRAPHIES
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

Law, (Literature Review),
W75-04020 5G

Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

BIOACCUMULATION
Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

BIOASSAY
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

BIOCHEMICAL OXYGEN DEMAND
Oxygenation of Waste Water,
W75-03858 5D

How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

BIODEGRADATION
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

BIODEGRATION
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

BIOLOGICAL COMMUNITIES
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

BISMUTH
Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

BIVARIATE REGRESSION MODEL
A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

BLACK FOREST
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

BLEACHING WASTES
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

BORDER IRRIGATION
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

BORON
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

BOUNDARY DISPUTES
Wineman v. Shannon Brothers Lumber Co., Inc. (Action Between Coterminous Riparian Landowners to Determine Accretion Apportionment).
W75-03994 6E

BOUNDARY LAYERS
Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

BOUNDARY VALUE PROBLEMS
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

BRACKISH WATER
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

BRAZIL
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

BREAKWATERS
Method and Apparatus for Breaking Waves,
W75-03868 8B

BRIDGE CONSTRUCTION
Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

BRISTOL AVON RIVER AUTHORITY (UK)
Quality Control in River Management of the Bristol Avon,
W75-04324 5G

BROWARD COUNTY (FLA)
Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

BROWN TROUT
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

BUBBLES
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

BUCKS COUNTY (PENN)
Conservation and Flooding Easements: A Case Study,
W75-04211 6E

BUFFALO RIVER (NY)
Rejuvenation of the Buffalo River,
W75-04248 5C

BUNTER SANDSTONE (UK)
Lysimeter Installations in Sandstone at Styrup, Nottinghamshire,
W75-04332 2G

BUREAU OF RECLAMATION
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

BUREAU OF WATER
How Chicago Manages its Distribution System,
W75-04197 6C

CADMIUM
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

CALCAREOUS SOILS
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

CALCIUM
Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

CALIBRATIONS
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

CALIFORNIA
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

Agronomic Survey of Jojoba in California,
W75-03960 3F

Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

Geohydrologic Map of Southern California,
W75-03973 7C

Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and

CALIFORNIA

Range Conditions in California's Annual Grassland,
W75-03990 4A

Project Skywater.
W75-04265 3B

Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

CANADA
Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

CANADA (QUEBEC)
Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

CANAL THEORY
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

CANALS
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

CARBOFURAN
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

CARBON
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

CARBON-14
Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

CARBON-14 GASES
C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

CARBON DIOXIDE
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

CARBONATES
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

CAUSTIC ALKALI
Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

CENTRIFUGATION
Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

CENTRIFUGES
Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

CERIUM
State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

CESIUM
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

CHANNEL IMPROVEMENT
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

CHANNEL LINERS
Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

CHANNEL MORPHOLOGY
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

CHANNELS
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

CHEMICAL ANALYSIS
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

CHEMICAL DEGRADATION
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

CHEMICAL OXIDANTS
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

CHEMICAL OXYGEN DEMAND
Soil Adsorption of Humic Color,
W75-04043 5D

Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

CHEMICAL PRECIPITATION
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Corrugated Ink and Starch Wastes Meet EPA Standards at St. Regis.
W75-03907 5D

CHEMICAL REACTIONS
Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

CHEMICAL SLUDGE
Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

CHEMICAL TREATMENT
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

CHEMICAL WASTES
Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

CHENA RIVER (ALASKA)
Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

CHESAPEAKE BAY
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

CHICAGO (ILLINOIS)
How Chicago Manages its Distribution System,
W75-04197 6C

CHLORIDE COMPOUNDS
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

CHLORIDES
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

CHLORINATED PARAFFINS
Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

CHOCTAWHATCHEE RIVER
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

CHROMATOGRAPHY
A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

CHROMIUM
New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

CHRYSAORA
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

CITIZEN PARTICIPATION
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

CITY PLANNING
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

CLARIFICATION
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

CLARIFIERS
Improved Clarification of Book Mill Effluent,
W75-03902 5D

CLASSIFICATION
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

CLAY LOAM
Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

CLAY MINERALS
Mechanistic Response of Expansive Clays,
W75-03955 2G

Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

CLAY-WATER SYSTEM
Mechanistic Response of Expansive Clays,
W75-03955 2G

CLAYS
Mechanistic Response of Expansive Clays,
W75-03955 2G

The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

CLIMATIC DATA
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

CLIMATOLOGY
Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

CLODS (SOIL)
A Flotation Method for the Rapid Measurement of the Wet Bulk Density of Soil Clods,
W75-04135 2G

CLOUDS
Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

COAGULATION
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Improved Clarification of Book Mill Effluent,
W75-03902 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

COAL MINES
Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

COALS
Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

COASTAL AQUIFERS
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

COASTAL ENGINEERING
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

COLIFORMS
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

COLOR
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Soil Adsorption of Humic Color,
W75-04043 5D

COLORADO
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

COMMUNITY DEVELOPMENT
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

COMPACTION
Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

COMPETING USES
Boats and Riparian Rights,
W75-04006 6E

COMPREHENSIVE PLANNING
Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

Whither Water.,
W75-04025 6B

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

COMPRESSIBILITY
Mechanistic Response of Expansive Clays,
W75-03955 2G

COMPUTER MODELS
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

COMPUTER PROGRAMS
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

COMPUTERS
Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

CONCRETE DAMS
Dam Building System,
W75-03873 8A

CONCRETE-LINED CANALS
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

CONDEMNATION
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

CONDENSATION
Milti-Stage Flash Evaporator,
W75-03860 3A

Hot Ball Desalination Process,
W75-03878 3A

CONDENSERS
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

CONDUITS
Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

Design of a Conduit System with Diverging Branches,
W75-03930 8A

CONFERENCES
Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

CONJUNCTIVE USE
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

CONNECTICUT RIVER
Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

CONSERVATION EQUATION
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

CONSTRAINTS
Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

CONSTRUCTION MATERIALS
Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

CONTROL
United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

CONTROL SYSTEMS
Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

CONVECTION-DIFFUSION EQUATION
Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

COOLING
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

COOLING TOWERS
Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

COOLING WATER
Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

Cooling Pond Temperature Prediction,
W75-04222 5B

Thermal Pollution Aspects in Europe,
W75-04226 5B

A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

CORN (FIELD)
Effect of Soil Temperature on Direction of Corn Root Growth,
W75-03954 3F

Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

CORRELATION ANALYSIS
Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

COSMIC RAYS
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

COSMOGONIC RADIOISOTOPES
Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

COST ANALYSIS
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

COST-BENEFIT ANALYSIS
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

Thermal Pollution of the Great Lakes -- A Non-Problem,
W75-04231 5B

Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

COST COMPARISONS
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

COSTS
Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

COTTON
The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

CREEKSHEDS
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

CREST-STAGE GAGES
Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

CROP MANAGEMENT
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

CROP PRODUCTION
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

Agronomic Survey of Jojoba in California,
W75-03960 3F

Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

CULTIVATION
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

CURRENTS (WATER)
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

CURVES
Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

CYANEA
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

CYANOPHYTA
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

CYGON
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

CZECHOSLOVAKIA
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

DAM CONSTRUCTION
Dam Building System,
W75-03873 8A

DAMS
Dam Building System,
W75-03873 8A

Ford Motor Co. V. Dallas Power and Light Co. (Action for Property Damage Resulting from Release of Waters from Dam During Time of Flooding).
W75-04297 6E

DATA ANALYSIS
Objective Double-Mass Analysis,
W75-04307 2B

DATA COLLECTIONS
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

Lakes of Oregon: Volume 2. Benton, Lincoln, and Polk Counties,
W75-03968 2H

Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

DATA PROCESSING
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

DATA STORAGE AND RETRIEVAL
The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

DDD
Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

DDT
Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

DDT ANALOGUES
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

DECENTRALIZATION
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

DECISION MAKING
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

Biderman V. Morton (Seeking Injunction to Restrain Construction on Fire Island Pending Environmental Impact Statement).
W75-04291 6E

DECLARATORY JUDGMENTS
Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

DECOMPOSING ORGANIC MATTER
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

DEEP PERCOLATION
Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

DEGRADATION (DECOMPOSITION)
Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

DELAWARE
The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

DELAWARE ESTUARY SYSTEM (DELAWARE)
The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

DELAWARE RIVER BASIN COMMISSION
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

DEMOGRAPHIC ACTIVITIES
Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

DENDROCHRONOLOGY
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

DENSITY
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

DEPARTMENT OF WATER AND SEWERS
How Chicago Manages its Distribution System,
W75-04197 6C

DESALINATION
Milti-Stage Flash Evaporator,
W75-03860 3A

Hot Ball Desalination Process,
W75-03878 3A

Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

DESERT PLANTS
A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

DESERTIZATION
A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

DESERTS
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

DESIGN
Operational Aspects of Urban Sewage Works,
W75-04114 5D

DESIGN CRITERIA
Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

DESIGN DATA
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

DESIGN GRAPHS
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

DETERGENTS
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

Rejuvenation of the Buffalo River,
W75-04248 5C

DETERIORATION
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

DEVILS HOLE PUPFISH
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

DEW
Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

DEW POINT
Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

DEWATERING
Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

DICHROMATE REFLUX METHOD
Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

DIFFUSERS
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

DIFFUSION
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

DIGESTED SLUDGE
Rebirth of the Sewage Farm.
W75-04337 5D

DIGESTION
Containing the Flow of Sewage Sludge.
W75-04336 5D

DISCHARGE (WATER)
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

DISCRETE DISTRIBUTION
CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

DISCRETE LINEAR MODEL
A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

DISPERSION
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

Models of Dispersion in a Granular Medium,
W75-04340 2F

DISPOSAL
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

DISSOLVED OXYGEN
The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

DISSOLVED SOLIDS
Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

DISTILLATION
Milti-Stage Flash Evaporator,
W75-03860 3A

Apparatus for Solar Distillation,
W75-03876 3A

Hot Ball Desalination Process,
W75-03878 3A

Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

DISTRIBUTION
Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

DISTRIBUTION PATTERNS
Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

DITCHES
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

DIVERSION STRUCTURES
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

DOMESTIC USE
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

DOMESTIC WASTES
Rejuvenation of the Buffalo River,
W75-04248 5C

DOMESTIC WATER
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

DOSE
The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

DOSE CALCULATIONS
Decay Scheme Data for Radiation Dose Calculations,
W75-04174 5A

DOSE COMMITMENT
The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

DOSE RATE
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

DOSE RATES
Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

DOSES
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

DOSIMETERS
Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

DOSIMETRY
Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

DOUBLE BRIDGES CREEK
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

DOUBLE TRIANGLE HYDROGRAPH
A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

DRAINAGE WATER
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

DRAINS
Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

DREDGING
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

DRIFTING (AQUATIC)
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

DRIP IRRIGATION
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

DROUGHT RESISTANCE
Agronomic Survey of Jojoba in California,
W75-03960 3F

Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

DROUGHT RESISTANCE (PLANTS)
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

DROUGHT TOLERANCE
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor (L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

DRY LAND FARMING
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

DRY-TYPE COOLING TOWER
Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

DRYING
The Three Stages of Drying A Field Soil,
W75-03965 2D

DRYLAND FARMING
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

DUAL SUPPLY SYSTEM
Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

DUNE SANDS
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

DYE DITCH (MISS)
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

DYNAMIC PROGRAMMING
Design of a Conduit System with Diverging Branches,
W75-03930 8A

Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS-1) WILDFIRE
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

EASEMENTS
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

ECONOMIC IMPACT
The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

ECONOMIC JUSTIFICATION
The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

ECONOMIC PREDICTION
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

ECONOMICS
Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

ECOSYSTEMS
Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

EFFICIENCIES
Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

EFFLUENT CONTROL
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

EFFLUENT LIMITATIONS
Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

EFFLUENTS
As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

EL PASO (TEX)
Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

ELECTRIC ANALOG MODELS
Application of Analog Techniques to Water Management,
W75-04202 6A

ELECTRIC POWER
Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

ELECTRIC POWER PRODUCTION
Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

ELECTRIC POWERPLANTS
Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

ELECTRICAL CONDUCTANCE
Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

ELECTRO-KINETICS
Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

ELECTRODES
Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

ELKHORN RIVER SUBBASIN (NEB)
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

EMANATION
Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

EMBRYONIC GROWTH STAGE
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

EMINENT DOMAIN
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

ENERGY
Symposium on Population Exposures,
W75-04152 5C

ENERGY BUDGET
An Energy Partition Evaporation Recorder,
W75-03937 2D

Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

ENERGY CASCADE SYSTEMS
Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

ENERGY TRANSFER
Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

ENVIRONMENT
A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

ENVIRONMENTAL CONTROL
Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

Progress in Satisfying Environmental Requirements,
W75-04018 5G

Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

ENVIRONMENTAL EFFECTS
Pollution Potential of Aquatic Sediments,
W75-04150 5B

Thermal Pollution Problems in Poland,
W75-04218 5C

Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

ENVIRONMENTAL IMPACT STATEMENTS
Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

ENVIRONMENTAL POLICY
Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

Non-Transportation Oil Spill Regulations.
W75-04303 5G

ENVIRONMENTAL SANITATION
Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

ENVIRONMENTAL STANDARDS
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

ENZYMES
Improved Clarification of Book Mill Effluent,
W75-03902 5D

EPHEMERAL STREAMS
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

EQUITABLE APPORTIONMENT
Wineman v. Shannon Brothers Lumber Co., Inc. (Action Between Coterminous Riparian Landowners to Determine Accretion Apportionment).
W75-03994 6E

EROSION
Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

EROSION CONTROL
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

ESTIMATING EQUATIONS
The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

ESTUARIES
Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

ESTUARINE ENVIRONMENT
The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

ESTUARINE FISHERIES
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

ESTUARINE ORGANISMS
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

EUROPE
Thermal Pollution Aspects in Europe,
W75-04226 5B

EUROPIUM
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

EUTROPHICATION
Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

The Eutrophication and Pollution of Lake Paijanne, Central Finland,
W75-04264 5C

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

Effect of Turbidity on Algal Growth,
W75-04306 5C

EVALUATION
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

Evaluating Multireservoir Operating Rules,
W75-03932 4A

Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

EVAPORATION
An Energy Partition Evaporation Recorder,
W75-03937 2D

The Three Stages of Drying A Field Soil,
W75-03965 2D

Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

Open Channel Flow Evaporation Study,
W75-04273 2D

EVAPORATORS
Milti-Stage Flash Evaporator,
W75-03860 3A

EVAPORIMETERS
An Energy Partition Evaporation Recorder,
W75-03937 2D

EXPERIMENTAL FARMS
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

FALLOUT
Nuclear Meteorology,
W75-04054 5B

Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Accumulation of Strontium-90 in Soils,
W75-04062 5B

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

FALLOUT

Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

FARM MANAGEMENT

The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

FARM WASTES

Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

FEDERAL GOVERNMENT

WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

Biderman V. Morton (Seeking Injunction to Restrain Construction on Fire Island Pending Environmental Impact Statement).
W75-04291 6E

Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

FEDERAL LEGISLATION

National Drinking Water Standards.
W75-03998 5G

FEDERAL WATER POLLUTION CONTROL ACT

Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

United States v. Holland (Action to Enjoin Unlawful Filling Operations).
W75-04005 6E

Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

Law, (Literature Review),
W75-04020 5G

United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

Non-Transportation Oil Spill Regulations.
W75-04303 5G

FEDERAL WATER POLLUTION CONTROL ACT AMMENDMENTS OF 1972

The Philosophy of S.2770,
W75-04001 5G

FEDERAL WATER QUALITY IMPROVEMENT ACT

United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

FEED LOTS

Soil Adsorption of Humic Color,
W75-04043 5D

FERROUS IRON

Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

FERTILITY

Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

FERTILIZATION

Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

FERTILIZERS

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

FIBERS (PLANT)

On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

FIBROUS MATERIALS

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

FILTERS

Filtration - Media Selection is the Key to Success,
W75-03943 5F

Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

FILTRATION

Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

Filtration - Media Selection is the Key to Success,
W75-03943 5F

Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

FINITE-DIFFERENCE METHOD

Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

FINITE ELEMENT ANALYSIS

Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

FINLAND (LAKE PAIJANNE)

The Eutrophication and Pollution of Lake Paijanne, Central Finland,
W75-04264 5C

FIRN

Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

FISH POPULATIONS
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

FISHERIES
The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

FISHKILLS
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

FISSION PRODUCTS
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

FLASH DISTILLATION
Milti-Stage Flash Evaporator,
W75-03860 3A

Hot Ball Desalination Process,
W75-03878 3A

FLASH EVAPORATION
Milti-Stage Flash Evaporator,
W75-03860 3A

FLOCCULATION
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

FLOOD CONTROL
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

FLOOD DAMAGE
Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

FLOOD FORECASTING
Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

FLOOD PEAK
A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

FLOOD PLAIN ZONING
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

FLOOD PLAINS
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

FLOOD PROFILES
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

FLOOD PROTECTION
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

FLOOD ROUTING
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

FLOODED SOILS
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

FLOODING
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

FLOODING REDUCTION
Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

FLOODPLAIN ZONING
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

FLOODS
Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

FLORIDA
The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

United States v. Holland (Action to Enjoin Unlawful Filling Operations).
W75-04005 6E

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

FLOTATION
On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

Microflotation, New-Old Water Purification Technique (Mikroflotation, nygammal vattenreningsteknik),
W75-03888 5D

FLOTATION METHOD
A Flotation Method for the Rapid Measurement of the Wet Bulk Density of Soil Clods,
W75-04135 2G

FLOW
The Ultrasonic Method of River Gauging,
W75-04026 4A

Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

FLOW AUGMENTATION
Evaluating Multireservoir Operating Rules,
W75-03932 4A

FLOW CHARACTERISTICS
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

FLOW RESISTANCE
Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

FLUORESCENCE
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

FLUORIDE
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

FLUOROSIS (SKELETAL)
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

FOOD CHAINS
Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

FORECASTING
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

Cooling Pond Temperature Prediction,
W75-04222 5B

FOREST WATERSHEDS
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

FORESTRY
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

FORMALDEHYDE
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

FOSSIL FUELS
Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

FOX RIVER (ILL)
Effect of Turbidity on Algal Growth,
W75-04306 5C

FROUDE NUMBER
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

FUEL CYCLE
Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

FUELS
Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

FURROW IRRIGATION
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

FURROWS
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

FWPCA AMENDMENTS OF 1972
Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

GAGING STATIONS
Objective Double-Mass Analysis,
W75-04307 2B

GAMMA RADIATION
Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

GAMMA RAYS
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

GAMMA TRANSMISSION METHOD
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

GAS CHROMATOGRAPHY
Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

GASES
Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

GENEVA (ALA)
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

GEOCHEMISTRY
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

GEOGRAPHICAL REGIONS
Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

GEORGIA
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

GEOTHERMAL STUDIES
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

GILLIES CREEK (VIRGINIA)
Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

GLACIERS
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

GOVERNMENTAL INTERRELATIONS
Scattering Fork Drainage District, County of Douglas v. Ogilvie (Suit Challenging Legality of Proposed Consruction of Water Reservoir Project).
W75-04008 6E

GRAIN SORGHUM
A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor (L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

GRASSES
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

GRASSLANDS
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

GRAVITY SEPARATION
Apparatus and Method for Effecting Separations,
W75-03872 5G

GRAVITY WAVES
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

GREAT LAKES
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

Thermal Pollution of the Great Lakes -- A Non-Problem,
W75-04231 5B

Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

GROUND WATER
Application of Analog Techniques to Water Management,
W75-04202 6A

GROUND WATER AVAILABILITY
Application of Analog Techniques to Water Management,
W75-04202 6A

GROUNDWATER
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

GROUNDWATER MANAGEMENT
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

GROUNDWATER MOVEMENT
Geohydrologic Map of Southern California,
W75-03973 7C

Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

Models of Dispersion in a Granular Medium,
W75-04340 2F

GROUNDWATER POTENTIAL
Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

GROUNDWATER RECHARGE
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

GROUNDWATER RESOURCES
Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

GROWTH RATE
Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

GROWTH RATES
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

GULF OF CALIFORNIA
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

GUPPIES
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

HAIL
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

HARBORS
Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

HARMONIC LINEAR WAVES
Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

HAWAII
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

HAZARDOUS SUBSTANCES
Reserve Mining Co. Et. Al. V. United States (Motion for Stay of Injunction).
W75-04296 6E

HAZARDOUS SUBSTANCES (POLLUTION)
United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

HAZARDS
Exposures to Five Target Health Hazards,
W75-04190 5A

Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

HEAT BALANCE
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

HEAT EXCHANGERS
Milti-Stage Flash Evaporator,
W75-03860 3A

HEAT FLOW
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

HEAT LOSS
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

HEAT TOLERANCE (PLANTS)
A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor (L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

HEATED SUBMERGED DISCHARGE
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

HEATED WATER
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

HEATED WATER

Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

HEAVY METALS
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

HECHLER VILLAGE BRANCH (VIRGINIA)
Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

HELE-SHAW MODELS
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

HENRICO COUNTY
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

HENRICO COUNTY (VIRGINIA)
Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

HERBICIDES
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

HEXAVALENT CHROMIUM
New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

HIGH PLAINS (N MEX)
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

HIGH WATER MARK
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

HISTORIC FLOODS
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

HISTORY
The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

Irrigation's Impact on Society.
W75-04138 3F

HUMAN ENVIRONMENT
Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

HUMAN POPULATION
Symposium on Population Exposures,
W75-04152 5C

The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

Decay Scheme Data for Radiation Dose Calculations,
W75-04174 5A

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

HUMUS
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

HUNGARY CREEK (VIRGINIA)
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

HYDRAULIC CONDUCTIVITY
Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots,
W75-03956 2I

HYDRAULIC GEOMETRY
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

HYDRAULIC MODELS
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

HYDRAULIC STRUCTURES
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

HYDRAULICS
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

HYDRODYNAMICS
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

HYDROELECTRIC PROJECT LICENSING
Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

HYDROGEN ION CONCENTRATION
Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

HYDROGEOLOGY
Geohydrologic Map of Southern California,
W75-03973 7C

Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

HYDROGRAPH ANALYSIS
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

HYDROGRAPHS
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

HYDROLOGIC DATA
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

HYDROLOGIC MODELS
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

HYDROLOGIC SYSTEMS
A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

HYDROLOGY
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

HYDROLYSIS
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

HYGIENIC STANDARDS
Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

HYGROSCOPIC WATER
Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

ICE
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

IDAHO
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

ILLINOIS
Scattering Fork Drainage District, County of Douglas v. Ogilvie (Suit Challenging Legality of Proposed Consruction of Water Reservoir Project).
W75-04008 6E

A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

Effect of Turbidity on Algal Growth,
W75-04306 5C

ILLINOIS RIVER (ILL)
Effect of Turbidity on Algal Growth,
W75-04306 5C

IMPACT EVALUATION DESIGN
Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

IMPACT STUDIES
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

IMPAIRED WATER QUALITY
Cutback in Costruction Funding Stirs Doubt on Water Quality Goals.
W75-03999 5G

IN-SITU MEASUREMENTS
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

INCINERATION
Containing the Flow of Sewage Sludge.
W75-04336 5D

INDIA
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

INDIA (JODHPUR.)
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

INDIA (RAJASTHAN CANAL PROJECT.)
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

INDIANA
Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Mixing in Anaerobic Digestion,
W75-04120 5D

INDUSTRIAL WASTES
Improved Process for Treating Water and Wastewater,
W75-03857 5D

Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

Effects of Phthalate Esters on Shrimp,
W75-04285 5C

Quality Control in River Management of the Bristol Avon,
W75-04324 5G

INDUSTRIAL WATER
Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

INDUSTRIES
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

INFILTRATION
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots,
W75-03956 2I

INFORMATION EXCHANGE
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

INFORMATION RETRIEVAL
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

INFRARED ANALYZERS
Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

INFRARED RADIATION
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

INFRARED RADIATION

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

INJUNCTIVE RELIEF
United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

INPUT-OUTPUT ANALYSIS
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

INSTRUMENTATION
Guide to Water Cleanup Materials and Methods,
W75-03880 5D

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

INSURANCE
Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

INTERNAL WATERS (JURISDICTION)
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

INTERNATIONAL LAW
The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

INTERNATIONAL WATERS
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

INTERSTATE COMMISSIONS
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

INTERTIDAL AREAS
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

INVERSE CONDEMNATION
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

INVERSION
Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

INVESTMENT
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

ION TRANSPORT
The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

IOWA
Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

IRAN
Pricing Irrigation Water in Iran,
W75-03936 3F

IRAQ
Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

IRON
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

IRRADATION
Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

IRREVERSIBLE THERMODYNAMICS
Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

IRRIGATED AGRICULTURE
Irrigation's Impact on Society.
W75-04138 3F

IRRIGATION
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

IRRIGATION DISTRICTS
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

IRRIGATION DITCHES
Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

IRRIGATION DITCHES *SALINITY
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

IRRIGATION EFFECTS
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

IRRIGATION EFFICIENCY
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

IRRIGATION PRACTICES
Trickle Irrigation System,
W75-03877 3F

IRRIGATION PROGRAMS
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

IRRIGATION (SUPPLEMENTAL)
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

IRRIGATION SYSTEMS
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

Trickle Irrigation System,
W75-03877 3F

Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

Irrigation's Impact on Society.
W75-04138 3F

IRRIGATION WATER
Pricing Irrigation Water in Iran,
W75-03936 3F

The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

ISOTHERMS
Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

ISOTOPE STUDIES
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

ISOTOPIC FRACTIONATION
Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

ISRAEL (ARAVA VALLEY)
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

JAPAN
Pollution Control in Japan-A Survey.
W75-04017 5G

JETS
Some Characteristics of Counterjet Flow,
W75-04217 5B

Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

JOJOBA
Agronomic Survey of Jojoba in California,
W75-03960 3F

JORDAN RIVER (UTAH)
Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

JUDICIAL DECISIONS
United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

Wineman v. Shannon Brothers Lumber Co., Inc. (Action Between Coterminous Riparian Landowners to Determine Accretion Apportionment).
W75-03994 6E

Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

Lemmons v. United States (Action for Damages for Revocation of Dredge Permit).
W75-04003 6E

United States v. Holland (Action to Enjoin Unlawful Filling Operations).
W75-04005 6E

Scattering Fork Drainage District, County of Douglas v. Ogilvie (Suit Challenging Legality of Proposed Consruction of Water Reservoir Project).
W75-04008 6E

U.S. V. Rohm and Haas Co. (Continuous Discharge Pollution Action Under Refuse Act).
W75-04290 6E

Biderman V. Morton (Seeking Injunction to Restrain Construction on Fire Island Pending Environmental Impact Statement).
W75-04291 6E

U.S. V. Lebeouf Bros. Towing Co., Inc. (Government Action to Recover Penalty Imposed by Coast Guard for Gasoline Spill in Ocean).
W75-04292 6E

Minnesota Public Interest Research Group V. Butz (Action for Injunctions Against Logging in Boundary Waters Canoe Area).
W75-04293 6E

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

Reserve Mining Co. Et. Al. V. United States (Motion for Stay of Injunction).
W75-04296 6E

Ford Motor Co. V. Dallas Power and Light Co. (Action for Property Damage Resulting from Release of Waters from Dam During Time of Flooding).
W75-04297 6E

United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

Courts Back State's Power to Halt Acid Mine Drainage,
W75-04301 5G

People (N.Y.) V. Cudak (Prosecution for Violating Moratorium on Alteration of Tidal Wetlands),
W75-04304 6E

JURISDICTION
The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

Marine Conservation Commission (As Amended).
W75-04004 6E

Scattering Fork Drainage District, County of Douglas v. Ogilvie (Suit Challenging Legality of Proposed Consruction of Water Reservoir Project).
W75-04008 6E

KANSAS
Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

KENTUCKY
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

KENTUCKY RIVER (KENT)
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

KINETICS
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Population Exposure from High-Energy Accelerators,
W75-04183 5C

KRYPTON
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

LABORATORY TESTS
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Effect of Turbidity on Algal Growth,
W75-04306 5C

Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

LAKE ERIE
Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

LAKE HURON
Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

LAKE MEAD (NEV)
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

LAKE MICHIGAN
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

LAKE ONTARIO
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

LAKE PONTCHARTRAIN (LA)
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

LAKE SEDIMENTS
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

LAKE SHASTINA (CALIF)
Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

LAKE ST. LOUIS (CANADA)
Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

LAKE SUPERIOR
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

LAKES
Lakes of Oregon: Volume 2. Benton, Lincoln, and Polk Counties,
W75-03968 2H

Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

LAND DEVELOPMENT
United States v. Holland (Action to Enjoin Unlawful Filling Operations).
W75-04005 6E

LAND SPREADING
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

LAND SUBSIDENCE
Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

LAND USE
Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

Some Socio-Agricultur Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

LANDFILLS
Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

LAS VEGAS VALLEY (NEVADA)
Application of Analog Techniques to Water Management,
W75-04202 6A

LASERS
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

LATERAL DISPERSION
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

LAW ENFORCEMENT
Law, (Literature Review),
W75-04020 5G

People (N.Y.) V. Cudak (Prosecution for Violating Moratorium on Alteration of Tidal Wetlands),
W75-04304 6E

LAW OF THE SEA
The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

LAWNDALE FARMS BRANCH (VIRGINIA)
Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

LEACHATE
Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

LEACHING
Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots,
W75-03956 2I

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

LEAD
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

LEAD RADIOISOTOPES
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

LEASES
Lemmons v. United States (Action for Damages for Revocation of Dredge Permit).
W75-04003 6E

LEAST SQUARES METHOD
The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

LEGAL ASPECTS
Guide to Water Cleanup Materials and Methods,
W75-03880 5D

U.S. V. Rohm and Haas Co. (Continuous Discharge Pollution Action Under Refuse Act).
W75-04290 6E

Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

Reserve Mining Co. Et. Al. V. United States (Motion for Stay of Injunction).
W75-04296 6E

Courts Back State's Power to Halt Acid Mine Drainage,
W75-04301 5G

LEGISLATION
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

Water Pollution and Control,
W75-03915 5B

The Philosophy of S.2770,
W75-04001 5G

Pollution Control in Japan-A Survey.
W75-04017 5G

Progress in Satisfying Environmental Requirements,
W75-04018 5G

Biderman V. Morton (Seeking Injunction to Restrain Construction on Fire Island Pending Environmental Impact Statement).
W75-04291 6E

LETHAL LIMIT
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

Effects of Phthalate Esters on Shrimp,
W75-04285 5C

Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

LETTUCE
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

LEVEES
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

LIABILITY (LEGAL ASPECTS)
Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

Ford Motor Co. V. Dallas Power and Light Co. (Action for Property Damage Resulting from Release of Waters from Dam During Time of Flooding).
W75-04297 6E

LIBRARIES
Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

LIGNINS
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

LIMNOLOGY
Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

LINEAR PROGRAMMING
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

LINEAR TRANSPORT THEORY
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

LINEAR WAVE PROPAGATION
Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

LININGS
Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

LIQUID-GAS EXCHANGE
Waste Water Treatment System,
W75-03879 5D

LIQUID WASTES
As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

LITTLE DESCHUTES RIVER (ORE)
Open Channel Flow Evaporation Study,
W75-04273 2D

LOCAL GOVERNMENTS
Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

LOCKS
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

LOESS DISTRIBUTION
Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

LONG-TERM PLANNING
Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

LOS ANGELES HARBOR (CALIF)
Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

LOW-FLOW AUGMENTATION
Rejuvenation of the Buffalo River,
W75-04248 5C

LUBRICANTS
Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

LULWORTHIA-MEDUSA
The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

LUMBERING
The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

LYSIMETERS
Flue-Cured Tobacco Yield and Oxygen Content of Soil in Lysimeters Flooded for Various Periods,
W75-04111 3F

Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

MACROPHYTES
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

MAGNESIUM
Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

MAINE. LUMBERING
United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

MANAGEMENT
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

Operational Aspects of Urban Sewage Works,
W75-04114 5D

Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for

MANAGEMENT

Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

MANAGEMENT OPTIONS

The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

MAPPING

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

MAPS

The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

Geohydrologic Map of Southern California,
W75-03973 7C

The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

MARINE DISPOSAL SYSTEMS

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

MARKOV PROCESSES

Stochastic Simulation of Daily Rainfall,
W75-04036 2B

The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

MASS CURVES

Objective Double-Mass Analysis,
W75-04307 2B

MASS SPECTROMETRY

Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

MATHEMATICAL MODELS

Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

Models of Dispersion in a Granular Medium,
W75-04340 2F

MATHEMATICAL STUDIES

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

MEASUREMENT

Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Exposures to Five Target Health Hazards,
W75-04190 5A

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

MEASURING INSTRUMENTS

Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

MELT WATER

Horizontal Water Migration of Strontium-90,
W75-04066 5B

MEMBRANE PROCESSES
Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

MEMBRANE SEPARATION
Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

MERCURY
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

METEOROLOGY
Nuclear Meteorology,
W75-04054 5B

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

Project Skywater.
W75-04265 3B

METHODOLOGY
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

METHOXYCHLOR
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

MEXICO
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

MICHIGAN
Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

MICRO-CONTROLLERS MELMIC 100
Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

MICROBIAL ACTIVITY
Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

MICROBIOLOGY
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

MICROWAVE REMOTE SENSING DEVICES
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

MIDVALE (UTAH)
Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

MINE WASTES
Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

MINERAL INDUSTRY
Lemmons v. United States (Action for Damages for Revocation of Dredge Permit).
W75-04003 6E

MINERALS
Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

MINING
The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

MINNESOTA
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

Reserve Mining Co. Et. Al. V. United States (Motion for Stay of Injunction).
W75-04296 6E

MISSISSIPPI
Wineman v. Shannon Brothers Lumber Co., Inc. (Action Between Coterminous Riparian Landowners to Determine Accretion Apportionment).
W75-03994 6E

Marine Conservation Commission (As Amended).
W75-04004 6E

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

MISSISSIPPI RIVER
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

MISSOURI
Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

MITCHELL GRASS
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

MIXING
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

Mixing in Anaerobic Digestion,
W75-04120 5D

Some Characteristics of Counterjet Flow,
W75-04217 5B

MODEL STUDIES
Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

Stochastic Simulation of Daily Rainfall,
W75-04036 2B

Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

MODEL TOPOLOGY
Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

MODEL VERIFICATION DATA
Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

MOISTURE
Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

MOISTURE AVAILABILITY
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

MOISTURE CONTENT
The Three Stages of Drying A Field Soil,
W75-03965 2D

A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

MOISTURE DEPLETION
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

MOISTURE STRESS
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

MOJAVE RIVER (CALIF)
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

MONITORING
An Alarming System for High-Solids White Water,
W75-03901 5G

An Energy Partition Evaporation Recorder,
W75-03937 2D

Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

MONTANA

Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

MONTEREY BAY (CALIF) DRIFT CARDS

A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

MONTGOMERY COUNTY (KANS)

Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

MORPHOEDAPHIC INDEX

The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

MOSQUITO CONTROL

Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

MOSQUITOES

Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

MOUNTAINS

The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

MULCH

Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

MULCHES

Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

MULTI-OBJECTIVE DESIGN

Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

MULTICHANNEL ANALYZER

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

MULTIPLE-PURPOSE PROJECTS

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

MUNICIPAL WASTES

Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

MUNICIPAL WATER

Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

MUNSON CREEK (MISS)

Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

MYRIOPHYLLUM SPICATUM

Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

NATIONAL ENVIRONMENTAL POLICY ACT

Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

Progress in Satisfying Environmental Requirements,
W75-04018 5G

Minnesota Public Interest Research Group V. Butz (Action for Injunctions Against Logging in Boundary Waters Canoe Area).
W75-04293 6E

NATURAL GAS

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

NAVIGABLE WATERS

United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

Cutback in Costruction Funding Stirs Doubt on Water Quality Goals.
W75-03999 5G

Boats and Riparian Rights,
W75-04006 6E

United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

Non-Transportation Oil Spill Regulations.
W75-04303 5G

NAVIGATION OBSTRUCTIONS

United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

NEBRASKA

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

NEMAHA COUNTY (KANS)

Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

NEUTRALIZATION
Improved Process for Treating Water and Wastewater,
W75-03857 5D

NEUTRON ABSORPTION
Population Exposure from High-Energy Accelerators,
W75-04183 5C

NEUTRON ACTIVATION ANALYSIS
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

NEUTRON METERS
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

NEUTRON PROBES
Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

NEVADA
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

Application of Analog Techniques to Water Management,
W75-04202 6A

Project Skywater.
W75-04265 3B

Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

NEW MEXICO
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

NEW YORK
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

Rejuvenation of the Buffalo River,
W75-04248 5C

Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

People (N.Y.) V. Cudak (Prosecution for Violating Moratorium on Alteration of Tidal Wetlands),
W75-04304 6E

NEW YORK BIGHT
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

NIGERIA
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

NITRATES
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

NITRIFICATION
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

NITROGEN
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

NITROGEN FIXATION
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

NITROGEN FIXING BACTERIA
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

NITROSOMONA
Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

NOBLE GASES
Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

NONLINEAR RAINFALL RESPONSE
The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

NORTH CAROLINA
Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

NORTH DAKOTA
Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

NORTH RUN (VIRGINIA)
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

NORTH SEA (NETHERLANDS)
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

NORTH TYGER RIVER (SC)
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

NUCLEAR ENERGY
Nuclear Meteorology,
W75-04054 5B

Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

Population Exposure from High-Energy Accelerators,
W75-04183 5C

NUCLEAR EXPLOSIONS
Nuclear Meteorology,
W75-04054 5B

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

Accumulation of Strontium-90 in Soils,
W75-04062 5B

Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

NUCLEAR FUELS
Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

NUCLEAR MOISTURE METERS
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

NUCLEAR PHYSICS
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

NUCLEAR POWERPLANTS
Symposium on Population Exposures,
W75-04152 5C

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

Thermal Pollution Aspects in Europe,
W75-04226 5B

Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

NUCLEAR REACTORS
Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

NUCLEATION
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

NUDIBRANCH
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

NUISANCE (LEGAL ASPECTS)
Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

NUMERICAL ANALYSIS
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

Open Channel Flow Evaporation Study,
W75-04273 2D

Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

NUTRIENT REMOVAL
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

NUTRIENT REQUIREMENTS
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

NUTRIENTS
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

OBSERVATION WELLS
The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

OCEAN CIRCULATION
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

OCEAN CURRENTS
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

OCEAN FLOOR
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

OCEANOGRAPHY
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

OCEANS
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

OHIO
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

OHIO RIVER
Lemmons v. United States (Action for Damages for Revocation of Dredge Permit).
W75-04003 6E

OIL
Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

OIL POLLUTION
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Skimming Apparatus,
W75-03870 5G

Apparatus and Method for Effecting Separations,
W75-03872 5G

On Pollution Control.
W75-04024 5G

An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

OIL SLICKS
Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

OIL SPILLS
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Skimming Apparatus,
W75-03870 5G

Apparatus and Method for Effecting Separations,
W75-03872 5G

Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

On Pollution Control.
W75-04024 5G

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

U.S. V. Lebeouf Bros. Towing Co., Inc. (Government Action to Recover Penalty Imposed by Coast Guard for Gasoline Spill in Ocean).
W75-04292 6E

United States V. Boyd (Discharge of Oil into Navigable Waters).
W75-04298 6E

United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

OIL WASTES
Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

OILY WASTES
Non-Transportation Oil Spill Regulations.
W75-04303 5G

ON-SITE DATA COLLECTIONS
Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

ON-SITE INVESTIGATIONS
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

Effect of Turbidity on Algal Growth,
W75-04306 5C

ON-SITE TESTS
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

OPEN CHANNEL FLOW
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

OPERATING RULES
Evaluating Multireservoir Operating Rules,
W75-03932 4A

OPERATIONS
Operational Aspects of Urban Sewage Works,
W75-04114 5D

OPHIOBOLUS-GRAMINIS
The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

OPTIMIZATION
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

OPTIMUM DEVELOPMENT PLANS
Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

OREGON
Lakes of Oregon: Volume 2. Benton, Lincoln, and Polk Counties,
W75-03968 2H

Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

Open Channel Flow Evaporation Study,
W75-04273 2D

Senate Subcommittee Hears Complaints on EPA Water Programs.
W75-04302 5G

Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

ORGANIC CARBON
Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

ORGANIC COMPOUNDS
Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

ORGANIC LOADING
Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

ORGANIC MATTER
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

ORGANOLEPTIC PROPERTIES
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

ORGANOPHOSPHORIS PESTICIDES
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

OSTEOPATHIES
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

OXIDATION
Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

OXYGEN ACTIVATED SLUDGE
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

OXYGEN TRANSFERS
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

OXYGENATION
Oxygenation of Waste Water,
W75-03858 5D

Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

OYSTERS
Marine Conservation Commission (As Amended).
W75-04004 6E

OZONE
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

PALOUSE REGION (IDA)
Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

PASTURE MANAGEMENT
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

PATENTS
Improved Process for Treating Water and Wastewater,
W75-03857 5D

Oxygenation of Waste Water,
W75-03858 5D

Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

Milti-Stage Flash Evaporator,
W75-03860 3A

Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Apparatus for Separating Solids from Liquids,
W75-03866 5D

Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

Method and Apparatus for Breaking Waves,
W75-03868 8B

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Skimming Apparatus,
W75-03870 5G

Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water,
W75-03871 8B

Apparatus and Method for Effecting Separations,
W75-03872 5G

Dam Building System,
W75-03873 8A

Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

Liquid Aerating Apparatus,
W75-03875 5D

Apparatus for Solar Distillation,
W75-03876 3A

Trickle Irrigation System,
W75-03877 3F

Hot Ball Desalination Process,
W75-03878 3A

Waste Water Treatment System,
W75-03879 5D

PATH OF POLLUTANTS
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

Horizontal Water Migration of Strontium-90,
W75-04066 5B

Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

PATORAN
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

PEA RIVER
Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

PEAK DISCHARGE
Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

PEDOLOGICAL CHANGES
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

PENALTIES (LEGAL)
U.S. V. Lebeouf Bros. Towing Co., Inc. (Government Action to Recover Penalty Imposed by Coast Guard for Gasoline Spill in Ocean).
W75-04292 6E

PENNSYLVANIA
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

Courts Back State's Power to Halt Acid Mine Drainage,
W75-04301 5G

The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

PERCOLATION
Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

Influence of Tobacco Plant Canopy on Percolation,
W75-03931 3F

Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

PERSONNEL EXPOSURE
Population Exposure from High-Energy Accelerators,
W75-04183 5C

PERU
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

PESTICIDE RESIDUES
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

PESTICIDES
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

PHENOLS
Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

PHILADELPHIA (PENN)
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

PHOSPHATES
Rejuvenation of the Buffalo River,
W75-04248 5C

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

PHOSPHOROUS
Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

PHOSPHORUS
Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

Phosphorus Detergent Ban-How Effective,
W75-04109 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

PHOSPHORUS COMPOUNDS
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

PHOTOGRAMMETRY
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

PHOTOSYNTHESIS
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

PHTHALATE ESTERS
Effects of Phthalate Esters on Shrimp,
W75-04285 5C

PHYTOPLANKTON
The Eutrophication and Pollution of Lake Paijanne, Central Finland,
W75-04264 5C

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

PIPELINES
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

Design of a Conduit System with Diverging Branches,
W75-03930 8A

PLANNING
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

More Responsive Water Planning is Possible,
W75-04203 6A

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

PLANT DISEASES
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

PLANT GROWTH
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

PLANT MORPHOLOGY
Agronomic Survey of Jojoba in California,
W75-03960 3F

PLATFORM DESIGN
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

PLUTONIUM
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

PNEUMATIC BARRIERS
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

POECILIA RETICULATUS
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

POINT BEACH PLANT
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

POLAND
Thermal Pollution Problems in Poland,
W75-04218 5C

POLITICAL ASPECTS
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

POLLUTANT IDENTIFICATION
Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

POLLUTANTS
Pollution Potential of Aquatic Sediments,
W75-04150 5B

Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

POLLUTION
Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

POLLUTION ABATEMENT
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Skimming Apparatus,
W75-03870 5G

How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

Cutback in Costruction Funding Stirs Doubt on Water Quality Goals.
W75-03999 5G

Rejuvenation of the Buffalo River,
W75-04248 5C

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

Reserve Mining Co. Et. Al. V. United States (Motion for Stay of Injunction).
W75-04296 6E

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

POLONIUM
Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

PONDS
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

POPULATION
Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

POPULATION EXPOSURE
Symposium on Population Exposures,
W75-04152 5C

The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

POPULATION EXPOSURE

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

POROSITY

The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

POROUS MEDIA

Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

Models of Dispersion in a Granular Medium,
W75-04340 2F

POTABLE WATER

Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

POWDER RIVER BASIN (MONT)

Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

POWERPLANTS

Thermal Pollution Problems in Poland,
W75-04218 5C

Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

Cooling Pond Temperature Prediction,
W75-04222 5B

Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

PRECIPITATION

Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

PRECIPITATION (ATMOSPHERIC)

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

Objective Double-Mass Analysis,
W75-04307 2B

Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

PRESSURE-DRIVEN MEMBRANE PROCESSES

Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

PRICING

Pricing Irrigation Water in Iran,
W75-03936 3F

PRIMARY PRODUCTIVITY

Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

PROBABILITY

Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

PRODUCTION

The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

PROJECT POST-EVALUATION

The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

PROJECTS

Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

PSYCHOLOGICAL ASPECTS

Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

PUBLIC ACCESS

Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

PUBLIC HEALTH

Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

Symposium on Population Exposures,
W75-04152 5C

The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Exposures to Five Target Health Hazards,
W75-04190 5A

Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

PUBLIC LANDS
Minnesota Public Interest Research Group V. Butz (Action for Injunctions Against Logging in Boundary Waters Canoe Area).
W75-04293 6E

PUBLIC PARTICIPATION
More Responsive Water Planning is Possible,
W75-04203 6A

PUBLIC RIGHTS
Boats and Riparian Rights,
W75-04006 6E

PUERTO RICO
Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

PULP AND PAPER INDUSTRY
An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

PULP WASTES
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

Microflotation, New-Old Water Purification Technique (Mikroflotation, nygammal vattenreningsteknik),
W75-03888 5D

Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

Possibilities for Purifying Recycled or Waste Waters from Paper Mills, Taking Physical-Chemical Processes into Account (Les possibilites d'epuration des eaux recyclees ou residuaires des papeteries, compte-tenu des procedes chimico-physiques),
W75-03893 5D

Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

Treatment of Residual Sludges: Generalities and Applications in the Paper Industry (Traitement des boues residuaires: Generalites et applications a l'industrie du papier),
W75-03898 5D

An Alarming System for High-Solids White Water,
W75-03901 5G

Improved Clarification of Book Mill Effluent,
W75-03902 5D

Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

Corrugated Ink and Starch Wastes Meet EPA Standards at St. Regis.
W75-03907 5D

Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

PUMPING
Design of a Conduit System with Diverging Branches,
W75-03930 8A

QUALITY CONTROL
Quality Control in River Management of the Bristol Avon,
W75-04324 5G

RADAR
Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

RADIATION
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

RADIATIVE TRANSFER THEORY
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

RADIOACTIVITY
Nuclear Meteorology,
W75-04054 5B

Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

RADIOACTIVITY

State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

Symposium on Population Exposures,
W75-04152 5C

The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

Decay Scheme Data for Radiation Dose Calculations,
W75-04174 5A

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Population Exposure from High-Energy Accelerators,
W75-04183 5C

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

RADIOACTIVITY EFFECTS

Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

RADIOCHEMICAL ANALYSIS

Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

RADIOISOTOPES

Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Accumulation of Strontium-90 in Soils,
W75-04062 5B

Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

Horizontal Water Migration of Strontium-90,
W75-04066 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

RADIUM

Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

RADIUM RADIOISOTOPES

The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

RADON

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

RAIN

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

RAIN GAGES

The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

RAINDROPS

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

RAINFALL

Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

RAINFALL DISPOSITION

Stochastic Simulation of Daily Rainfall,
W75-04036 2B

RAINFALL-ELEVATION RELATIONSHIPS

The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

RAINFALL-RUNOFF RELATIONSHIPS

The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

RANGE GRASSES

Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

RANGE MANAGEMENT

Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

RECHARGE

Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

RECIRCULATED WATER
An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

RECLAIMED WATER
New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

RECLAMATION
A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

RECREATION
Evaluating Multireservoir Operating Rules,
W75-03932 4A

The Elements of Carrying Capacity in the Recreation Utilization of Reservoirs,
W75-04249 6B

RECREATION DEMAND
The Elements of Carrying Capacity in the Recreation Utilization of Reservoirs,
W75-04249 6B

RECYCLING
Possibilities for Purifying Recycled or Waste Waters from Paper Mills, Taking Physical-Chemical Processes into Account (Les possibilites d'epuration des eaux recyclees ou residuaires des papeteries, compte-tenu des procedes chimico-physiques),
W75-03893 5D

REEDY RIVER (SC)
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

REFUSE ACT OF 1899
United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

REGIONAL ANALYSIS
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

Regional Management of Waste Systems,
W75-04000 5D

REGRESSION ANALYSIS
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

REGULATION
Guide to Water Cleanup Materials and Methods,
W75-03880 5D

The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

Pollution Control in Japan-A Survey.
W75-04017 5G

Progress in Satisfying Environmental Requirements,
W75-04018 5G

Non-Transportation Oil Spill Regulations.
W75-04303 5G

People (N.Y.) V. Cudak (Prosecution for Violating Moratorium on Alteration of Tidal Wetlands),
W75-04304 6E

RELOCATION
Objective Double-Mass Analysis,
W75-04307 2B

REMOTE SENSING
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

RESEARCH FACILITIES
Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

RESERVOIR OPERATION
Evaluating Multireservoir Operating Rules,
W75-03932 4A

Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

RESERVOIR RELEASES
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

RESERVOIRS
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

The Elements of Carrying Capacity in the Recreation Utilization of Reservoirs,
W75-04249 6B

RESISTANCE
Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

REVERSE OSMOSIS
Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

REVIEWS
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

Treatment of Residual Sludges: Generalities and Applications in the Paper Industry (Traitement des boues residuaires: Generalites et applications a l'industrie du papier),
W75-03898 5D

Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

Law, (Literature Review),
W75-04020 5G

Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

RICE
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

RIGHT-OF-WAY
Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

RIPARIAN PLANTS
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

RIPARIAN RIGHTS
Boats and Riparian Rights,
W75-04006 6E

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

RIVER BASIN COMMISSION
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

RIVER BASIN COMMISSIONS
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

RIVER BASINS
Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

RIVER FLOW
The Ultrasonic Method of River Gauging,
W75-04026 4A

A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

RIVER REGULATION
Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

RIVER SYSTEMS
Evaluating Multireservoir Operating Rules,
W75-03932 4A

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

RIVERS
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

Open Channel Flow Evaporation Study,
W75-04273 2D

RIVERS AND HARBORS ACT
United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

U.S. V. Rohm and Haas Co. (Continuous Discharge Pollution Action Under Refuse Act).
W75-04290 6E

United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

ROCKY BRANCH (VIRGINIA)
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

ROCKY MOUNTAIN REGION
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

ROOT ZONE
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

ROOTS
Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

RUNOFF
Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

SAFE DRINKING WATER ACT
Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

SAFE DRINKING WATER ACT OF 1973
National Drinking Water Standards.
W75-03998 5G

SAFETY
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

SAGINAW BAY (MICH)
Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

SALINE SOILS
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

SALINE WATER
Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

SALINE WATER BARRIERS
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

SALINE WATER-FRESHWATER INTERFACES
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

SALINE WATER INTRUSION
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

SALINITY
The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

SALMONIDS
Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

SALT MARSHES
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

SAN FRANCISCO BAY AREA (CALIF)
Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

SAN JUAN MOUNTAINS (COLO)
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

SANDS
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

SANDSTONES
Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

SANDY SOILS
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

SANTEE RIVER (SOCAR)
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

SASKATCHEWAN WATER RESOURCES
Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

SATURATED FLOW
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

SCENEDESMUS QUADRACAUDA
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

SCHEDULING
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

SCOTLAND
Water Pollution and Control,
W75-03915 5B

SCOUR
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

SEA NETTLES
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

SEA WATER
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

SEASONAL
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

SECCHI DEPTH
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

SECONDARY RECOVERY (OIL)
Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

SEDIMENT DISTRIBUTION
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

SEDIMENT TRANSPORT
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

SEDIMENTS
Pollution Potential of Aquatic Sediments,
W75-04150 5B

Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

SEEDBED CONFIGURATION
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

SEEDS
Agronomic Survey of Jojoba in California,
W75-03960 3F

SEICHES
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

SELECTIVE WITHDRAWAL
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

SELENASTRUM CAPRICORNUTUM
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

SEMIARID CLIMATES
Agronomic Survey of Jojoba in California,
W75-03960 3F

Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

SEMIPERMEABLE MEMBRANES
Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

SENSITIVITY ANALYSIS
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

SEPARATION TECHNIQUES
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Apparatus for Separating Solids from Liquids,
W75-03866 5D

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Apparatus and Method for Effecting Separations,
W75-03872 5G

Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

Filtration - Media Selection is the Key to Success,
W75-03943 5F

Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

SETTLED DOMESTIC SEWAGE
Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

SEVIER LAKE (UTAH)
Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

SEVIER RIVER (UTAH)
Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

SEWAGE
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

SEWAGE DISPOSAL
Investigation for the Marine Disposal of Effluents,
W75-04289 5B

SEWAGE EFFLUENTS
Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

SEWAGE SLUDGE DISPOSAL
Containing the Flow of Sewage Sludge.
W75-04336 5D

SEWAGE SYSTEMS
Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

SEWAGE TREATMENT
Oxygenation of Waste Water,
W75-03858 5D

Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

Waste Water Treatment System,
W75-03879 5D

Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Phosphorus Detergent Ban-How Effective,
W75-04109 5D

Operational Aspects of Urban Sewage Works,
W75-04114 5D

Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

Containing the Flow of Sewage Sludge.
W75-04336 5D

Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

SEWERAGE
Operational Aspects of Urban Sewage Works,
W75-04114 5D

Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

SEWERS
Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

SHELLFISH FARMING
Marine Conservation Commission (As Amended).
W75-04004 6E

SHIPPING
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

SHIPS
Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

SHORE PROTECTION
Method and Apparatus for Breaking Waves,
W75-03868 8B

Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water,
W75-03871 8B

SHRIMP
Effects of Phthalate Esters on Shrimp,
W75-04285 5C

SIERRA NEVADA MOUNTAINS
Project Skywater.
W75-04265 3B

SILVER IODIDE
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

SIMULATION ANALYSIS
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

SITES
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

SKIMMING
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

Skimming Apparatus,
W75-03870 5G

SLUDGE
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

SLUDGE INCINERATION
Containing the Flow of Sewage Sludge.
W75-04336 5D

SLUDGE REMOVAL
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

SLUDGE TREATMENT
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

Treatment of Residual Sludges: Generalities and Applications in the Paper Industry (Traitement des boues residuaires: Generalites et applications a l'industrie du papier),
W75-03898 5D

Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

SMALL WATERSHEDS
Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

Protecting Creeksheds, Analysis and Action,
W75-03948 4D

Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

SNAKE RIVER (IDA)
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

SNOW
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

Horizontal Water Migration of Strontium-90,
W75-04066 5B

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

SNOW COVER
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

SNOW MANAGEMENT
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

SNOWFLAKES
Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

SOCIAL CHANGE
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

SOCIAL IMPACT
Irrigation's Impact on Society.
W75-04138 3F

SOCIAL PARTICIPATION
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

SOCIOECONOMIC MODELS
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

SODIUM
Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

SOIL ADSORPTION BEDS
Soil Adsorption of Humic Color,
W75-04043 5D

SOIL AGGREGATES
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

SOIL CHEMICAL PROPERTIES
Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

SOIL CLASSIFICATION
Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska,
W75-04314 2G

SOIL COLUMNS
Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

SOIL CONSERVATION
Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

SOIL CONTAMINATION
Accumulation of Strontium-90 in Soils,
W75-04062 5B

Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

SOIL DENSITY
A Flotation Method for the Rapid Measurement of the Wet Bulk Density of Soil Clods,
W75-04135 2G

SOIL EROSION
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

SOIL MOISTURE
The Three Stages of Drying A Field Soil,
W75-03965 2D

Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

SOIL MOISTURE METERS
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

SOIL PROFILES
Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

SOIL PROPERTIES
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

SOIL STABILITY
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

SOIL SURFACE.S
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

SOIL TEMPERATURE
Effect of Soil Temperature on Direction of Corn Root Growth,
W75-03954 3F

Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

SOIL TERPERATURE
Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska,
W75-04314 2G

SOIL TESTS
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

SOIL TEXTURE
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

SOIL TREATMENT
The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

SOIL TYPES
Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

SOIL WATER
The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

SOIL-WATER-PLANT RELATIONSHIPS
Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots,
W75-03956 2I

Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

SOIL WATER POTENTIAL
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

SOIL WATER SUCTION
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

SOILS
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

SOLAR CELLS
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLAR DISTILLATION
Apparatus for Solar Distillation,
W75-03876 3A

SOLAR ENERGY SYSTEMS
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLAR RADIATION
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLAR STILLS
Apparatus for Solar Distillation,
W75-03876 3A

Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLAR THERMAL ENERGY
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLAR WATER HEATERS
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

SOLID-LIQUID SEPARATION
Apparatus for Separating Solids from Liquids,
W75-03866 5D

SOLID WASTES
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

SOLIDS TRANSPORT CAPACITY
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

SORPTION
Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

SOUTH CAROLINA
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

SOUTHEAST US
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

SOYBEANS
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

SPAIN
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

SPALLATION
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

SPECIFIC ACTIVITY CONCEPT
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

SPECIFIC RADIOACTIVITY
Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

SPECTROMETER
A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

SPECTROMETERS
Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

SPECTROPHOTOMETRY
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer,
W75-04093 5A

A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

SPECTROSCOPY
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

SPILLWAYS
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

SPLASH EROSION
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

SPOIL BANKS
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

SPOIL DISPOSAL
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

SPRECTOSCOPY
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

SPRING WATER
Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

SPRINGS
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

ST. LAWRENCE RIVER
Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

ST. PETERSBURG RESERVOIR (PENN)
Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

STABLE ISOTOPES
Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

STACK HEIGHT
Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

STANDARDS
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

STANNOUS FLUORIDE TREATMENT
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

STARCH
How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

STATE GOVERNMENTS
The Philosophy of S.2770,
W75-04001 5G

Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

STATE LEGISLATION
Regional Management of Waste Systems,
W75-04000 5D

STATE POLICY
Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

Courts Back State's Power to Halt Acid Mine Drainage,
W75-04301 5G

STATISTICAL ANALYSIS
A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

STATISTICAL MODELS
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

STATISTICS
The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

STEADY FLOW
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

STEREO ORIFICES
The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

STOCHASTIC MODELS
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

STOCHASTIC PROCESSES
Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

Stochastic Simulation of Daily Rainfall,
W75-04036 2B

Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

STOPPING MANEUVER
Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

STORAGE
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

STORM RUNOFF
The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

STORMS
Project Skywater.
W75-04265 3B

STRATIFICATION
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

STRATOSPHERE
Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

STREAMFLOW
Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

STREAMS
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

STRIP MINES
Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

STRONTIUM
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

Accumulation of Strontium-90 in Soils,
W75-04062 5B

Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

Horizontal Water Migration of Strontium-90,
W75-04066 5B

State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

SUBSOIL
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

SUBSURFACE WATERS
Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

SULFATE REDUCTION
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

SULFIDE OXIDATION
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

SULFIDE-SELECTIVE ELECTRODE
Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

SULFIDES
Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

SULFITE LIQUORS
Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

SULFUR
Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

SULFUR COMPOUNDS
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

SUNFISHES
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

SUPPLEMENTAL IRRIGATION
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

SURFACE DRAINAGE
Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

SURFACE-GROUNDWATER RELATIONSHIPS
Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

SURFACE RUNOFF
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

Ford Motor Co. V. Dallas Power and Light Co. (Action for Property Damage Resulting from Release of Waters from Dam During Time of Flooding).
W75-04297 6E

SURFACE WATER AVAILABILITY
Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

SURFACE WATERS
Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

Quality and Availability of Water in Western-most Texas,
W75-03979 2K

Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

SURVEILLANCE PROGRAM
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

SURVEYS
Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

SUSPENDED SOLIDS
On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

SWITZERLAND (BAYE DE MONTREUX)
The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

SYNTHETIC HYDROLOGY
A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

SYSTEMS ANALYSIS
Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

TACONITE TAILINGS
Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

TCDD
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

TEMPERATURE
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

TEMPERATURE-TOXICITY RELATIONSHIPS
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

TERRACES
Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

TERRITORIAL WATERS
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

TESTING PROCEDURES
A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

TEXAS
Quality and Availability of Water in Western-most Texas,
W75-03979 2K

Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

U.S. V. Rohm and Haas Co. (Continuous Discharge Pollution Action Under Refuse Act).
W75-04290 6E

Ford Motor Co. V. Dallas Power and Light Co. (Action for Property Damage Resulting from Release of Waters from Dam During Time of Flooding).
W75-04297 6E

TEXAS (SOUTHERN HIGH PLAINS)
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

TEXTILES
Water Pollution and Control,
W75-03915 5B

THEORETICAL ANALYSIS
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

THERMAL BARS
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

THERMAL COOLING SYSTEMS
Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

THERMAL POLLUTION
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

Thermal Pollution Problems in Poland,
W75-04218 5C

Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

Cooling Pond Temperature Prediction,
W75-04222 5B

THERMAL POLLUTION

Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

Thermal Pollution Aspects in Europe,
W75-04226 5B

Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

Thermal Pollution of the Great Lakes -- A Non-Problem,
W75-04231 5B

Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

THERMAL POWERPLANTS

Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

Thermal Pollution Aspects in Europe,
W75-04226 5B

THERMAL RADIATION

Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

THERMAL SPRINGS

Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

THERMAL STRATIFICATION

Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

THERMAL TOLERANCE

The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

THERMAL WATER

Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

THERMODYNAMIC BEHAVIOR

Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

THERMODYNAMICS

Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

Open Channel Flow Evaporation Study,
W75-04273 2D

THERMOMETERS

Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

THORIUM

Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

THORON

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

THORPE BRANCH (VIRGINIA)

Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

THREE-DIMENSIONAL FLOW

Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

TIDAL MARSHES

People (N.Y.) V. Cudak (Prosecution for Violating Moratorium on Alteration of Tidal Wetlands),
W75-04304 6E

TIDES

Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

TILE DRAINS

Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

TIME DEPENDENCE

The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

TIME SERIES ANALYSIS

The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

Objective Double-Mass Analysis,
W75-04307 2B

CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

TOBACCO

Influence of Tobacco Plant Canopy on Percolation,
W75-03931 3F

Flue-Cured Tobacco Yield and Oxygen Content of Soil in Lysimeters Flooded for Various Periods,
W75-04111 3F

TOMATO

Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

TOPSOILS

Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

TOXICITY

Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

Exposures to Five Target Health Hazards,
W75-04190 5A

Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

Effects of Phthalate Esters on Shrimp,
W75-04285 5C

Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

TOXICITY AROCLOR

Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

TOXINS

Exposures to Five Target Health Hazards,
W75-04190 5A

TRACE ELEMENTS
Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

TRACERS
Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

TRACTOR TRAFFIC
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

TRANSMISSIVITY
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

TRANSPIRATION
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

TRANSPORTATION
Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

TRANSVERSE MIXING
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

TREATMENT FACILITIES
Guide to Water Cleanup Materials and Methods,
W75-03880 5D

An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

Corrugated Ink and Starch Wastes Meet EPA Standards at St. Regis.
W75-03907 5D

TREE RINGS
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

TREES
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

TRENT RIVER AUTHORITY (UK)
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

TRICKLE IRRIGATION
Trickle Irrigation System,
W75-03877 3F

TRITIUM
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

TROPOSPHERE
Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

TROUT
Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

TURBIDITY
Effect of Turbidity on Algal Growth,
W75-04306 5C

TURBULENCE
Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

TURBULENT FLOW
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

TURTLES
Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

TWO LAYER SYSTEMS
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

TYPIC TORRIFLUVENT SOILS
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

TYPIC TORRIORTHENT SOILS
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

UDIC MOISTURE REGIME
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

ULTRAFILTRATION
Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

ULTRASONIC METHODS
The Ultrasonic Method of River Gauging,
W75-04026 4A

ULTRAVIOLET RADIATION
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

UNGAGED WATERSHEDS
A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

UNIT HYDROGRAPHS
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

UNITED KINGDOM
Whither Water.,
W75-04025 6B

UNITED KINGDOM (HULL RIVER)
Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

UNITED STATES
Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

U.S. V. Rohm and Haas Co. (Continuous Discharge Pollution Action Under Refuse Act).
W75-04290 6E

U.S. V. Lebeouf Bros. Towing Co., Inc. (Government Action to Recover Penalty Imposed by Coast Guard for Gasoline Spill in Ocean).
W75-04292 6E

UNSTEADY FLOW
Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

URANIUM
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

URBAN ENVIRONMENTAL ENHANCEMENT
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

URBAN HYDROLOGY
A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

URBAN SOCIOLOGY
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

URBANIZATION
Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

UREA (SULFURCOATED)
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

USSR
Nuclear Meteorology,
W75-04054 5B

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

USSR (LENINGRAD)
Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

UTAH
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

VERMONT
Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

VERTICAL MIGRATION
Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

VIRGIN RIVER (UTAH)
Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

VISCOSITY
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

VOTING
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

WASHINGTON
More Responsive Water Planning is Possible,
W75-04203 6A

WASTE DILUTION
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

Some Characteristics of Counterjet Flow,
W75-04217 5B

WASTE DISPOSAL
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

WASTE MANAGEMENT
Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

WASTE MANAGEMENT SYSTEMS
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

WASTE TREATMENT
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

WASTE VAPOR
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

WASTE WATER DISPOSAL
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

WASTE WATER POLLUTION
Regional Management of Waste Systems,
W75-04000 5D

WASTE WATER TREATMENT
Improved Process for Treating Water and Wastewater,
W75-03857 5D

Oxygenation of Waste Water,
W75-03858 5D

Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

Apparatus for Separating Solids from Liquids,
W75-03866 5D

Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

Liquid Aerating Apparatus,
W75-03875 5D

Apparatus for Solar Distillation,
W75-03876 3A

Hot Ball Desalination Process,
W75-03878 3A

Waste Water Treatment System,
W75-03879 5D

Guide to Water Cleanup Materials and Methods,
W75-03880 5D

The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

Microflotation, New-Old Water Purification Technique (Mikroflotation, nygammal vattenreningsteknik),
W75-03888 5D

Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

Possibilities for Purifying Recycled or Waste Waters from Paper Mills, Taking Physical-Chemical Processes into Account (Les possibilites d'epuration des eaux recyclees ou residuaires des papeteries, compte-tenu des procedes chimico-physiques),
W75-03893 5D

Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

Treatment of Residual Sludges: Generalities and Applications in the Paper Industry (Traitement des boues residuaires: Generalites et applications a l'industrie du papier),
W75-03898 5D

Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

Improved Clarification of Book Mill Effluent,
W75-03902 5D

Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

Corrugated Ink and Starch Wastes Meet EPA Standards at St. Regis.
W75-03907 5D

Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

Quality Water for Human Consumption and Industry,
W75-03941 5D

Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

EPA's Pollution Control Goals Take Broadside in Seattle.
W75-04023 5G

Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

Soil Adsorption of Humic Color,
W75-04043 5D

Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

Phosphorus Detergent Ban-How Effective,
W75-04109 5D

Operational Aspects of Urban Sewage Works,
W75-04114 5D

Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

Mixing in Anaerobic Digestion,
W75-04120 5D

Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

Filtration Engineering's Symposium on Membrane Separation.
W75-04122 5D

An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

Containing the Flow of Sewage Sludge.
W75-04336 5D

Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

WASTES
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

WATER ANALYSIS
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

WATER CIRCULATION
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

WATER CONSERVATION
Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

WATER CONSUMPTION
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

WATER CONVEYANCE
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

WATER COOLING
Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

WATER COSTS
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

WATER DELIVERY
How Chicago Manages its Distribution System,
W75-04197 6C

WATER DEMAND
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

WATER DISTRIBUTION
Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

How Chicago Manages its Distribution System,
W75-04197 6C

WATER DISTRIBUTION (APPLIED)
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

Design of a Conduit System with Diverging Branches,
W75-03930 8A

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

WATER DISTRIBUTION DIVISION
How Chicago Manages its Distribution System,
W75-04197 6C

WATER DISTRIBUTIONS (APPLIED)
Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

WATER DISTRICTS
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

WATER EQUIVALENT
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

WATER IMPORTING
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

WATER LAW
WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

WATER LAWS
Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

WATER LEVELS
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

WATER LOSS
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

WATER MANAGEMENT
How Chicago Manages its Distribution System,
W75-04197 6C

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

Application of Analog Techniques to Water Management,
W75-04202 6A

The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

WATER MANAGEMENT (APPLIED)
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

Protecting Creeksheds, Analysis and Action,
W75-03948 4D

Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

WATER PERMITS
The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

WATER POLICY
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

How Chicago Manages its Distribution System,
W75-04197 6C

More Responsive Water Planning is Possible,
W75-04203 6A

WATER POLLUTION

United States v. Kennebec Log Driving Co. Et Al. (Suit by Government to Enjoin Log-Driving Activities on Upper Kennebec River).
W75-03996 6E

Cutback in Costruction Funding Stirs Doubt on Water Quality Goals.
W75-03999 5G

United States v. Holland (Action to Enjoin Unlawful Filling Operations).
W75-04005 6E

WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

Pollution Control in Japan-A Survey.
W75-04017 5G

Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

Phosphorus Detergent Ban-How Effective,
W75-04109 5D

The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

United States V. Ira. S. Bushey and Sons, Inc. (Discharge of Refuse into Navigable Waters--Oil Spills),
W75-04300 6E

Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

WATER POLLUTION CONTROL

Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

Apparatus and Method for Effecting Separations,
W75-03872 5G

Guide to Water Cleanup Materials and Methods,
W75-03880 5D

Water Pollution and Control,
W75-03915 5B

Cutback in Costruction Funding Stirs Doubt on Water Quality Goals.
W75-03999 5G

Regional Management of Waste Systems,
W75-04000 5D

The Philosophy of S.2770,
W75-04001 5G

Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

Pollution Control in Japan-A Survey.
W75-04017 5G

Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

EPA's Pollution Control Goals Take Broadside in Seattle.
W75-04023 5G

On Pollution Control.
W75-04024 5G

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

Vermont V. New York, Et Al. (Proposed Consent Decree Disapproved).
W75-04299 6E

Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

Quality Control in River Management of the Bristol Avon,
W75-04324 5G

Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

WATER POLLUTION CONTROL ACT

National Drinking Water Standards.
W75-03998 5G

WATER POLLUTION EFFECTS

The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

WATER POLLUTION SOURCES

Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

Pollution Potential of Aquatic Sediments,
W75-04150 5B

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

Freeman Coal Mining Corp. V. Illinois Pollution Control Board (Appeal from of Pollution Control Board Holding That Defendant Made Illegal Discharges).
W75-04295 6E

WATER POLLUTION TREATMENT

Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

WATER PROPERTIES

Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

WATER PURIFICATION
Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

Microflotation, New-Old Water Purification Technique (Mikroflotation, nygammal vattenreningsteknik),
W75-03888 5D

Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

Possibilities for Purifying Recycled or Waste Waters from Paper Mills, Taking Physical-Chemical Processes into Account (Les possibilites d'epuration des eaux recyclees ou residuaires des papeteries, compte-tenu des procedes chimico-physiques),
W75-03893 5D

A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

WATER QUALITY
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

Quality Water for Human Consumption and Industry,
W75-03941 5D

Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

Thermal Pollution Problems in Poland,
W75-04218 5C

Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

Control of Water Pollution: Miscellaneous Provisions.
W75-04323 5G

WATER QUALITY ADMINISTRATION
The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

WATER QUALITY CONTROL
United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

National Drinking Water Standards.
W75-03998 5G

Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

EPA's Pollution Control Goals Take Broadside in Seattle.
W75-04023 5G

An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

Quality Control in River Management of the Bristol Avon,
W75-04324 5G

WATER QUALITY IMPROVEMENT ACT
United States v. Republic Steel Corporation (Prosecution for Unlawful Discharge of Coal Tar into a River).
W75-03992 5G

WATER QUALITY STANDARDS
Water Pollution and Control,
W75-03915 5B

National Drinking Water Standards.
W75-03998 5G

The Philosophy of S.2770,
W75-04001 5G

Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

WATER REQUIREMENTS
Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

WATER RESOURCES
Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

More Responsive Water Planning is Possible,
W75-04203 6A

Water for the Human Environment, Volume IV, Special Sessions.
W75-04213 5B

Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

WATER RESOURCES ACT OF 1971 (WASHINGTON)
More Responsive Water Planning is Possible,
W75-04203 6A

WATER RESOURCES DEVELOPMENT
Whither Water.,
W75-04025 6B

Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

Conservation and Flooding Easements: A Case Study,
W75-04211 6E

A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

WATER REUSE
An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

WATER RIGHTS
Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

WATER RIGHTS (NON-RIPARIANS)
Opinion of the Justices to the House of Representatives (Relating to the Constitutionality of a Bill Creating a Public 'On-Foot Free Right-of-Passage' Along Shore of Coastline).
W75-04294 6E

WATER SAMPLE PRESERVATION
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

WATER SOURCES
Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

WATER STORAGE
Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

WATER SUPPLY
Pricing Irrigation Water in Iran,
W75-03936 3F

Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

WATER SUPPLY DEVELOPMENT
Whither Water.,
W75-04025 6B

Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

WATER TABLE
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

WATER TEMPERATURE
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

Cooling Pond Temperature Prediction,
W75-04222 5B

WATER TRANSFER
Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

WATER TREATMENT
Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

Quality Water for Human Consumption and Industry,
W75-03941 5D

Filtration - Media Selection is the Key to Success,
W75-03943 5F

Regional Management of Waste Systems,
W75-04000 5D

WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

WATER USES
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

WATER UTILIZATION
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor (L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

WATER WORKS
How Chicago Manages its Distribution System,
W75-04197 6C

WATER YIELD IMPROVEMENT
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

WATERCOURSES
Kelso v. C.B.K. Agronomics, Inc. (Action by Upstream Landowners for Damages Due to Construction of Concrete Structure Across River by Downstream Owners).
W75-03997 6E

WATERSHED MANAGEMENT
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

WATERSHEDS (BASINS)
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

WATERWAYS
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

WAVE ACTION
Method and Apparatus for Breaking Waves,
W75-03868 8B

Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water,
W75-03871 8B

WAVE FORCES
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

WAVES
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

WAVES (WATER)
Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

WEATHER
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

WEATHER MODIFICATION
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

Project Skywater.
W75-04265 3B

WEST VIRGINIA
United States v. 21.54 Acres of Land, Marshall County, West Virginia (Condemnation Case for Flowage Easements Near Dam Site).
W75-03993 6E

WET AIR OXIDATION
Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

WETTING
The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

WHEAT
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

WHEAT YIELD
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

WHITE WATER
An Alarming System for High-Solids White Water,
W75-03901 5G

WHITE WATERS (PAPER MACHINE EFFLUENTS)
On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

WINDS
Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows,
W75-04059 2B

Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

WISCONSIN
Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

An Alarming System for High-Solids White Water,
W75-03901 5G

Improved Clarification of Book Mill Effluent,
W75-03902 5D

Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

WITHDRAWAL
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

WONDER (NEV)
The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

WOOD WASTES
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

WYOMING
Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

XENON
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

XERIC MOISTURE REGIME
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

YIELD EQUATIONS
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

YOCKANOOKANY RIVER (MISS)
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

ZEBRAFISH
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

ZINC
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

ZINC RADIOISOTOPES
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

AUTHOR INDEX

ABDULLAH, S. A.
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

ABRAHAM, G.
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

ADAIR, J. E.
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

AHLSTROM, S. W.
Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

AKAMATSU, I.
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

ALAERTS-SMEESTERS, E.
Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

ALLEN, D. M.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

ALLMARAS, R. R.
Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

ANDERS, L.
Apparatus for Separating Solids from Liquids,
W75-03866 5D

ANDERSON, W.
Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

ANPILOGOV, A. K.
On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

ANTROPOVA, Z. G.
Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

ARDIS, C. V. JR.
A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

ARDMAN, A.
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

ARMSTRONG, D. E.
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

ARMSTRONG, E. T.
Waste Water Treatment System,
W75-03879 5D

ASKEW, A. J.
Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

ATHEY, T. W.
The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

AVERETT, R. C.
Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

AVRAMENKO, A. S.
Application of the Stochastic Approach to the Problem of the Radioactivity of Raindrops and Cloud-Borne Drops,
W75-04074 5B

Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

AXTELL, R.
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

AYLESWORTH, J. W.
Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

BACHER, K.
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

BAGNULO, L.
Skimming Apparatus,
W75-03870 5G

BAKULIN, V. N.
Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

BANASZAK, K. J.
Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

BANKS, H. O.
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

BANSAL, I. K.
Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

BARD, S. T.
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

BARNES, I.
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

BARTON, C. J.
Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

BASSOCO, L. M.
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

BAUMANN, E.
Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

BAUMANN, F. J.
Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

BEAR, J.
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

BEARDEN, H. W.
Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

BEATTY, K. W.
Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

BEAVER, D. W.
Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

BECKER, L.
Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

BEDFORD, W. K.
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

BELFORT, G.
Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

BELOVA, E. I.
Comparative Distribution of Strontium-90 and Cesium-137 in Different Types of Soils,
W75-04064 5B

BENEDICT, B. A.
Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

BERKHOFF, J. C. W.
Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

BERNARD, S. R.
A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

BERRY, J. W.
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

BERTRAND, G. L.
Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

BEST, G. A.
Water Pollution and Control,
W75-03915 5B

BETHLAHMY, N.
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

BHARARA, L. P.
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

BHARGAVA, G. P.
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

BHATI, N. S.
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

BHUIYA, Z. H.
Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

BILDER, R. B.
The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

BISSELL, V. C.
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

BISWAS, T. D.
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

BLASKOVICH, D. D.
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

BLEAK, A. T.
Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

BLEVINS, R. L.
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

BLOMEKE, J. O.
Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

BOERSMA, L.
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

BOHN , H. L.
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

BOLTON, E. F.
Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

BOON, A. G.
Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

BORISEK, R.
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

BOSSHARDT, E.
Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

BOX, G. F.
Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

BOYER, J. A.
Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

BRADY, R. A.
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

BRECHER, E. M.
Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

BRIDGE, B. J.
The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

BRIDGE, L. R.
Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

BRIERE, F.
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

BRISTOL, K.
How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

BRITTON, L. J.
Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

BROADWAY, J. A.
An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

BROCK, R. E.
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

BRULAND, K. W.
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

BRUNNER, D. R.
Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

BRUTSAERT, W.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

BUCK, W.
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

BUDDE, W. L.
Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

BUGLIARELLO, G.
Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

BURGESS, D. R.
Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

BURKE, O. W.
Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

BURSON, Z. G.
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

BURTSEV, I. I.
Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

BURTSEVA, L. V.
Comparison of the Characteristics of Hygroscopic and Non-Hygroscopic Aersol Washout by Cloud-Borne Drops,
W75-04075 5B

BUSBY, M. W.
Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

BYSTROVA, L. P.
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

CALLAWAY, R.
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

CAMERON, D. R.
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

CAMPBELL, D. J.
A Flotation Method for the Rapid Measurement of the Wet Bulk Density of Soil Clods,
W75-04135 2G

CAMPBELL, R. B.
Flue-Cured Tobacco Yield and Oxygen Content of Soil in Lysimeters Flooded for Various Periods,
W75-04111 3F

CARDENAS, M. A.
Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

CARGO, D. G.
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

CARLSON, G. A.
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

CARNAHAN, C. L.
Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

CARNEGGIE, D. M.
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

CARTER, L. J.
Pollution and Public Health: Taconite Case Poses Major Test,
W75-04326 5G

CARTER, M. W.
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

CARTER, R. F.
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

CASAS, J. L. O.
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

CEARLOCK, D. B.
Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

CHANDRA, S.
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

CHANG, M.
Objective Double-Mass Analysis,
W75-04307 2B

CHANG, Y. C.
Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

CHARBENEAU, R. J.
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

CHAUBE, U. C.
A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

CHEKA, J. S.
Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

CHILDERS, W. N.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

CHIRKOV, V. P.
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

CHOWDHURY, M. Y.
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

CHRISTIANSON, A. G.
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

CHUNICHEV, V. B.
Radiochemical Method of Determining Low Strontium-90 Concentration Levels in Environmental Samples,
W75-04102 5A

CHURKIN, V. N.
Graphoanalytical Method for Determining Cesium-137 Concentration in Soil Samples from the Gamma Spectrum,
W75-04101 5A

Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

CLANCY, M.
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

CLARK, F. H.
Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

COCHRAN, D. A.
Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

COHEN, A.
Apparatus for Determining Organic Carbon Content of Polluted Liquids,
W75-03861 5A

COLWELL, R. N.
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

COMBS, P. G.
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

CONROY, L. E.
A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

COPP, H. D.
More Responsive Water Planning is Possible,
W75-04203 6A

CREEL, B. J.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

CRESSLER, C. W.
Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

CROCKER, J. D.
Liquid Aerating Apparatus,
W75-03875 5D

CROLEY, T. E. II.
Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

CRYSDALE, R. A.
The Elements of Carrying Capacity in the Recreation Utilization of Reservoirs,
W75-04249 6B

CULLEN, T. H.
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

D'ANGIURO, L.
Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

DABADGHAO, P. M.
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

DALL, B. V.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

DANON, S.
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

DARGENE, N. P.
Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

DARR (DALINSKY), P.
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

DAS, H. A.
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

DAVIDSON, D. E.
The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

DAVYDOV, E. N.
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

DAYAL, R.
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

DE BOODT, M.
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

DE LA TORRE, J. R.
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

DE VOS, P.
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

DEB ROY, R.
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

DEGLORIA, S. D.
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

DHIR, R. P.
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

DICKSON, H. W.
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

DIGIANE, F. A.
Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

DILLEY, A. C.
An Energy Partition Evaporation Recorder,
W75-03937 2D

DINES, A. J.
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

DINOEVA, S.
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

DMITRIEVA, G. V.
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

DOBSON, H. F. H.
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

DODSON, A. N.
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

DOJLIDO, J.
Thermal Pollution Problems in Poland,
W75-04218 5C

DOLEY, D.
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

DOMENICO, P. A.
Application of Analog Techniques to Water Management,
W75-04202 6A

DONG, A. E.
Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

DRABKOWSKI, E. F.
Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

DRUFFEL, L.
Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

DUKES, J. C.
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

DURBIN, T. J.
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

DUTT, G. R.
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

EARHART, J. R.
Liquid Aerating Apparatus,
W75-03875 5D

ECHELBERGER, W. F.
Mixing in Anaerobic Digestion,
W75-04120 5D

ECKERT, R. D.
Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

EDWARDS, A. B.
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

EDWARDS, M. D.
The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

EDWARDS, M. L.
Method and Apparatus for Breaking Waves,
W75-03868 8B

EFREMOVA, G. P.
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

EGLI, P.
Evaluating Multireservoir Operating Rules,
W75-03932 4A

EICHELBERGER, J. W.
Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

ELIAS, V.
Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

ENGLER, R. M.
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

ENVOLDSEN, J.
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

FASTMAN, S. M.
Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

FAZZOLARE, R. A.
A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

FERGUSSON, J. R.
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

FERREIRA, R. F.
Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

FETISOV, V. A.
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

FFOLLIOTT, P. F.
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

FILECCIA, R. J.
Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

FISETTE, G. R.
Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

FLEGONTOV, V. M.
Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

FLORES, A.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

FOGARTY, W. J.
Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

FOLCHETTI, J. R.
Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

FOLEY, J. W.
Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

FOLLEA, B.
An Example of Treatment of Effluents From Papermaking With a View Toward Recycling (Un exemple de traitement des effluents de papeterie en vue du recyclage),
W75-03887 5D

FOSTER, S. S. D.
Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

FREEDMAN, P. L.
Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

FRENCH, J. J.
Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

FRETWELL, G.
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

FRIDAY, J.
Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

FRIEDLANDER, J.
Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

FRITTS, H. C.
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

FRYREAR, D. W.
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

FUJII, T.
Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

FURUKAWA, Y.
On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

GABRIELS, D.
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

GAIKWAD, V. R.
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

GAJBHIYE, K. E.
Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

GALINATO, G. D.
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

GALLAGHER, B. J.
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

GAMBOLATI, G.
Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

GAMMAGE, R. B.
Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

GARBO, P. W.
Oxygenation of Waste Water,
W75-03858 5D

GARCIA, J. A.
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

GARDNER, B. D.
Pricing Irrigation Water in Iran,
W75-03936 3F

GARRY, S. M.
Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

GASPAR, M. J.
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

GASPAR, R. D.
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

GAST, R. G.
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

GASYUNAS, V. N.
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

GATES, J. S.
Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

GATZ, A. J.
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

GAVIDIAO, A.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

GAZIEV, Y. I.
Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

GEDENOV, L. I.
Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

GEDEONOV, L. I.
Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

GEL'FAND, E. D.
On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

GEORGE, P. S.
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

GESSELL, T. F.
Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

GIBBS, E. L.
Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

GILBERTSON, M.
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

GILEADI, A. E.
Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

GINN, J. R.
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

GLUECKSTERN, P.
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

GOETTE, J. P. JR.
Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

GOGOLAK, C. V.
Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

GOLDBERG, E. D.
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

GOLDEN, J. C.
A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

GOLTZ, S. M.
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

GONZALES, L. E.
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

GONZALEZ, F. I. JR.
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

GOODALL, M. R.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

GOPALAKRISHNAN, V.
Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

GOTTSCHLING, R. D.
Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

GOVE, G.
Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

GRANBERG, K.
The Eutrophication and Pollution of Lake Paijanne, Central Finland,
W75-04264 5C

GRASS, L. B.
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

GRAVES, W. L. JR.
Cooling Pond Temperature Prediction,
W75-04222 5B

GREENWAY, H.
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

GRENNEY, W. J.
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

GRIBBIN, J.
Whither Water.,
W75-04025 6B

GRITCHENKO, Z. G.
Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

Penetration of Radioactive Fission Products from 1964-1967 Nuclear Tests into the Ground Layer of the Atmosphere in the Leningrad Area,
W75-04104 5B

Seasonal Beryllium-7 Variations in Ground Level Air,
W75-04084 5A

GROSS, S. P.
Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

GUARINO, C. F.
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

GULI, F. P.
Thermal Pollution Aspects in Europe,
W75-04226 5B

GUNTHER, F. J.
Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

GUPTA, I. C.
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

GUPTA, V. K.
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

GUSTAFSON, P. F.
Thermal Pollution of the Great Lakes -- A Non-Problem,
W75-04231 5B

GUTER, K. J.
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

GUTERMAN, I. G.
Mean and Turbulent Transfer of Substances Over the USSR,
W75-04060 2B

HAAN, C. T.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

HAIMES, Y. Y.
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

HALE, L. A.
Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

HALL, G. F.
Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

HALL, T.
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

HALTSMAN, J. G.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

HAMILTON, L. D.
Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

HARDEN, D. G.
Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

HARDT, W. F.
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

HARLEY, J. H.
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

HARRIS, L. E.
Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

HARRIS, R. F.
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

HARRIS, R. H.
Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

HATFIELD, J.
Operational Aspects of Urban Sewage Works,
W75-04114 5D

HAY, H. R.
Apparatus for Solar Distillation,
W75-03876 3A

HAZRA, C. R.
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

HEALY, H. G.
The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

HECKROTH, C.
Water Reuse...Safe Drinking Act...How Soon...How Good.
W75-04322 5G

HEERDEGEN, R. G.
The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

HEIDMAN, J. A.
Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

HENRI-ROBERT, M. P.
Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

HERSCHY, R. W.
The Ultrasonic Method of River Gauging,
W75-04026 4A

HILLSBERG, J.
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

HINKLE, L. A.
Pollution Potential of Aquatic Sediments,
W75-04150 5B

HIRSCH, W. Z.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

HOBBS, B. B.
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

HOCK, A. G.
Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

HOLLEY, E. R.
Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

HOPSON, N. E.
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

HUANG, J. C.
Pollution Potential of Aquatic Sediments,
W75-04150 5B

HUBBARD, D. W.
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

HULL, A. C. JR.
Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

HULL, A. P.
As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

HYNES, H. B.
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

IBATULLIN, M. S.
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

IDSO, S. B.
The Three Stages of Drying A Field Soil,
W75-03965 2D

ILICHKINA, A. G.
Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

INGHAM, G. S. N.
Quality Control in River Management of the Bristol Avon,
W75-04324 5G

INGRAM, H. M.
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

IOKHEL'SON, S. V.
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

IPINMIDUN, W. B.
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

IZRAEL', Y. A.
Calculation of Fractionation Effects in Atmospheric Nuclear Bursts,
W75-04068 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

JACKSON, R. D.
The Three Stages of Drying A Field Soil,
W75-03965 2D

JAFFEE, H.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

JAGGI, I. K.
Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

JAISINGHANI, R. A.
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

JAMES, D. E.
The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

JAMIESON, J. B.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

JANSMA, J. D.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

JAROS, J.
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

JENSEN, W.
Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

JERNIGAN, E. B.
Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

JOERING, E. A.
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

JOHNSON, A. M. F.
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

JOHNSON, G. P.
Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

JOHNSON, G. V.
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

JOHNSON, J. K.
Liquid Aerating Apparatus,
W75-03875 5D

JOHNSON, J. M.
Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

JONES, L. T.
Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

JONES, L. W.
Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

JORDAAN, J. M. JR.
Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

JORDAN, D.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

KABEYA, H.
Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

KAHAN, J. P.
A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

KAISER, N.
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

KAMEN, C. S.
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

KAMISHIMA, H.
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

KANTOR, Y.
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

KARADI, G. M.
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

KARELSE, M.
Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

KASHYAP, R. L.
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

KAUSHIK, N. K.
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

KAYE, S. V.
The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

KEE, C. W.
Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

KEENE, J. C.
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

KELLER, W.
Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

KENNEDY, V. S.
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

KERR, G. D.
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

KERR, S. R.
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

KETCHESON, J. W.
Effect of Soil Temperature on Direction of Corn Root Growth,
W75-03954 3F

KETURAH, A.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

KEVERN, N. R.
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

KHAN, M. U.
Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

KIEFER, W.
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

KIM, U.
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

KIMBALL, B. A.
The Three Stages of Drying A Field Soil,
W75-03965 2D

KIMURA, Y.
Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

KING, D. L.
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

KING, R.
Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

KIREMIDJIAN, L.
Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

KIRICHENKO, L. V.
Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

KITCHING, R.
Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

KLASS, E.
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

KLEIN, D. A.
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

KNIGHT, K. L.
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

KNOWLES, R.
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

KOIDE, M.
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

KOLERSKII, S. V.
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

KOLUVEK, P.
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

KONSTANTINOV, I. E.
Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

KOSHI, P. T.
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

KOSTER, J.
Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

KOUBEK, E.
Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

KOVNATSKII, E. F.
A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

KRASNOPEVTSEV, Y. V.
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

KRAUS, G.
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

KRIZEK, R. J.
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

KUDISH, A. I.
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

KUNZ, C.
C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

KUPTSOV, V. M.
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

KUZENKOV, A. F.
Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

KUZNETSOV, YU. V.
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

KUZNETSOVA, G. A.
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

LABUSHKIN, V. G.
Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

LAEVASTU, T.
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

LANSFORD, R. R.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

LAROSE, R. H.
A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

LARSEN, O. J. F.
Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water,
W75-03871 8B

LARSON, J. D.
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

LAWRENCE, A. W.
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

LEADLEY, S. M.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

LECLERC, A.
Evaluating Multireservoir Operating Rules,
W75-03932 4A

LEE, R.
Objective Double-Mass Analysis,
W75-04307 2B

LEKHTMAKHER, S. O.
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

LEONARD, M. C.
Boats and Riparian Rights,
W75-04006 6E

LEONE, R. A.
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

LEVINA, G. P.
State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

LEWINGER, K. L.
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

LEWIS, G. L.
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

LI, K. W.
Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

LI, W. C.
Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

LIANG, T.
Design of a Conduit System with Diverging Branches,
W75-03930 8A

LIAW, J. R.
Open Channel Flow Evaporation Study,
W75-04273 2D

LIN, A-L.
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

LIN, P.
Improved Process for Treating Water and Wastewater,
W75-03857 5D

LINTON, D.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

LITVER, B. Y.
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

LIU, P. J. P.
Milti-Stage Flash Evaporator,
W75-03860 3A

LOCK, M. A.
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

LOFTUS, K. H.
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

LONGENECKER, D. E.
The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

LOO, W.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

LOUCKS, D. P.
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

LOWDER, W. M.
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

LUSH, D. L.
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

LUYANAS, V. Y.
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

MACGREGOR, J. M.
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

MACLEOD, M.
An Alarming System for High-Solids White Water,
W75-03901 5G

Mill Achieves Maximum Reuse of Water with Reverse Osmosis,
W75-03899 5D

MADHI, Y.
Pricing Irrigation Water in Iran,
W75-03936 3F

MAGNIN, E.
Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

MAHONEY, W. E.
C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

MAIER, M.
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

MAIER, W. J.
A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

MAKHON'KO, E. P.
Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

MAKHON'KO, K. P.
Atmospheric Washout of Radioactive Contaminant in the Mountains of Central Caucasus,
W75-04076 5B

Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

Natural Snowflake Radioactivity Due to Short-Lived Radon Decay Products,
W75-04107 5A

Some Theoretical Notions of Radioactivity Acquisition by Raindrops,
W75-04072 5B

Trace Elements and Natur Radioactivity in Cloud Water and Atmospheric Precipitation in the Central Caucasus Mountains,
W75-04108 5A

MALAKHOV, S. G.
Distribution of Fission Products Over Oceans in the Tropical Zone and Their Relation to Atmospheric Processes,
W75-04056 5B

Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

Vertical Distribution of the Concentration of Radon Decay Products in the 0-300-m Layer,
W75-04106 5B

MALAN, G. L.
Dam Building System,
W75-03873 8A

MALHOTRA, S. P.
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

MANN, B. J.
Decay Scheme Data for Radiation Dose Calculations,
W75-04174 5A

MARECAUX, P.
Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

MARIAPPAN, M.
Pollution Potential of Aquatic Sediments,
W75-04150 5B

MARINO, M. A.
Models of Dispersion in a Granular Medium,
W75-04340 2F

Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

MARSHALL, C. E.
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

MARTIN, J. A. JR.
Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

MARTIN, J. E.
Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

MARTINEZ, R. P.
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

MARWAHA, S. P.
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

MASSARO, E. J.
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

MATHERLY, J. E.
Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

MATHIAN, M.
Treatment of Residual Sludges: Generalities and Applications in the Paper Industry (Traitement des boues residuaires: Generalites et applications a l'industrie du papier),
W75-03898 5D

MATULYAVICHYUS, V. P.
Accounting for Some Nonsteady Processes in Recording Natural Air Radioactivity,
W75-04080 5A

MAXWELL, P. A. R.
The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

MAYER, P. G.
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

MAZURIN, N. F.
Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

MCBEAN, E. A.
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

MCCONNELL, H. L.
A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

MCCOY, G. A.
Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

MCDOWELL, C.
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

MCERLEAN, A. J.
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

MCGUINNESS, W. V. JR.
The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

MCKAY, L. R.
Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

MCKEOWN, J. J.
Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

MCKEWEN, T. D.
Regional Management of Waste Systems,
W75-04000 5D

MCLAUGHLIN, J. E.
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

MCMAHON, M. A.
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

MEHDI, S.
Pricing Irrigation Water in Iran,
W75-03936 3F

MEJIA, J. M.
Evaluating Multireservoir Operating Rules,
W75-03932 4A

MELONI, E.
Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

MENON, A. S.
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

MERCURI, L.
Apparatus and Method for Effecting Separations,
W75-03872 5G

MERRIMAN, D.
Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

METCALF, R. L.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

MEZHEVOVA, V. A.
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

MICHEL, J. W.
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

MIDDLEBROOKS, E. J.
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

MIHURSKY, J. A.
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

MILLER, E. L.
Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

MILLER, H. H. JR.
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

MILLER, K. M.
Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

MILLER, R. A.
Soil Adsorption of Humic Color,
W75-04043 5D

The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

MILLER, T. O.
C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

MINGUILLO, F.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

MINJAUW, D.
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

MISRA, D. K.
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

MIYAMOTO, S.
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

MODGAL, S. C.
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

MOGHISSI, A. A.
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

MOHN, F.
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

MONROE, H. J.
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

MOORE, B. R.
Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

MOORE, R. E.
The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

MORGELI, B.
Possibilities for Purifying Recycled or Waste Waters from Paper Mills, Taking Physical-Chemical Processes into Account (Les possibilites d'epuration des eaux recyclees ou residuaires des papeteries, compte-tenu des procedes chimico-physiques),
W75-03893 5D

MORIGUCHI, Z.
Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

MORRIS, S. C.
Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

MORTEZA, H.
Pricing Irrigation Water in Iran,
W75-03936 3F

MOSEEVA, D. P.
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

MOSONYI, E.
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

MOSS, M. D.
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

MOSSE, H.
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

MOYLE, W. R. JR.
Geohydrologic Map of Southern California,
W75-03973 7C

MUALEM, Y.
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

MUNTEANU, A. G.
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

MURTY, T. S.
Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

MUSKIE, E. S.
The Philosophy of S.2770,
W75-04001 5G

MUSSELWHITE, C. C.
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

NAIR, P. K. R.
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

NAKAYAMA, F. S.
The Three Stages of Drying A Field Soil,
W75-03965 2D

NAZAROV, I. M.
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

NAZAROV, L. E.
Size Distribution of High-Activity Particles in the Troposphere in September-December 1967,
W75-04070 5B

Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

NEBEL, C.
Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

NEDVETSKAITE, T. N.
New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

NEHRING, R. B.
Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

NELSON, C. B.
Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

NELSON, M. D.
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

NELSON, W. W.
Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

NETTLES, M. E.
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

NEU, H. J. A.
Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

NEUFELD, R.
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

NIENSTADT, H.
Irrigation Ditch Liner and Method for Making Same,
W75-03863 4A

NIZHNIKOV, A. N.
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

NORRIS, L. A.
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

NORTH, R. M.
The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

NORTON, R. D.
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

NOVAK, J. T.
Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

NOVAKOVA, S. P.
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

NYE, J. R.
Trickle Irrigation System,
W75-03877 3F

O'CONNOR, H. G.
Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

O'DONNELL, F. R.
Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

O'NEILL, H. J.
Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

OGORODNIKOV, B. I.
Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

OGUNLELA, V. B.
A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor (L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

OHMAN, H. L.
Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

OKUN, D. A.
Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

ONDERDONK, J. J.
Effect of Soil Temperature on Direction of Corn Root Growth,
W75-03954 3F

ONISHI, H.
Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

ORLOB, G. T.
Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

ORMEROD, K.
Operational Aspects of Urban Sewage Works,
W75-04114 5D

PACKARD, F. A.
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

PARK, B. K.
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

PARKER, F. L.
Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

PARTOVI, S.
Pricing Irrigation Water in Iran,
W75-03936 3F

PARTRIDGE, J. E.
An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

PARZYCK, D. C.
Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

PATRICK, W. H. JR.
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

PATTEA, C.
Report on: Arizona Indian Water Rights Conference,
W75-04143 6E

PATTERSON, W. D.
Progress in Satisfying Environmental Requirements,
W75-04018 5G

PATWA, F. C.
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

PAVLIC, R. A.
A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

PAVLOTSKAYA, F. I.
State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

PEARSON, S. C.
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

PERDUE, P. T.
Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

PERKINS, E. S.
Self-Cleaning Filter for Hydrological Regeneration,
W75-03864 5D

PERLMUTTER, A.
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

PETERSON, H. T. JR.
Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

PETROV, V. N.
The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

PETRYANOV, I. V.
Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

PETTIGREW, A.
Quality Water for Human Consumption and Industry,
W75-03941 5D

PETTS, K. W.
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

PFEIFFER, W. C.
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

PHILLIPS, C. R.
An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

PHILLIPS, J. R.
Hot Ball Desalination Process,
W75-03878 3A

PHILLIPS, R. E.
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

PIECZONKA, P.
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

PISKUNOV, L. I.
Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

PITRE, D. L.
Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

POGRUND, R. S.
Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

POLEV, N. M.
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method,
W75-04094 5A

POLYAKOVA, T. V.
Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

POMERANTS, L. B.
Effectiveness of the Pre-Aerator (Effektivnost' raboty pre-aeratora),
W75-03905 5D

PONCE, S. L.
The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

POOK, E. W.
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

POPOV, V. I.
Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols,
W75-04098 5A

PORCELLA, D. B.
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

PORGES, R.
Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

PORTE, H. A.
Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

POSTON, J. W.
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

POWERS, W. L.
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

PRASAD, M. V. R.
Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

PRASAD, R.
New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

PREISENDORFER, R. W.
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

PRESSER, T. S.
Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

PREUL, H. C.
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

PROCTOR, F. B.
Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

PRYOR, W. A.
Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

QUTUB, M. Y.
A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A., W75-04258 6B

RAATS, P. A. C.
Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots, W75-03956 2I

RABOTNOVA, F. A.
Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry, W75-04099 5A

RAMAMURTHY, A. S.
Some Characteristics of Counterjet Flow, W75-04217 5B

RAMANUJAM, S.
New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water, W75-04113 5A

RAMASESHAN, S.
A Discrete Linear Model for the Hydrologic Basin, W75-04242 2A

RAMIREZ, G. E.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru, W75-04313 3F

RAMZAEV, P. V.
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions, W75-04063 5B

RAO, A. RAMACHANDRA
Stochastic Models for the Interaction of Rainfall and Groundwater Levels, W75-03949 2A

RAO, R. G. SRINIVASA
Stochastic Models for the Interaction of Rainfall and Groundwater Levels, W75-03949 2A

RAPP, A.
A Review of Desertization in Africa--Water, Vegetation, and Man, W75-04142 2J

RATH, A.
Identification of a Distributed Parameter System in Hydrology, W75-04280 2F

RAWAT, B. S.
Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil, W75-04136 2G

RAY, S. B.
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition, W75-04346 3F

REDKIN, Y. N.
Preliminary Data on the Measurement of the Atmospheric Aerosol Characteristics with a Centrifugal Spectrometer, W75-04093 5A

REGIER, H. A.
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation, W75-04116 5C

REGINATO, R. J.
The Three Stages of Drying A Field Soil, W75-03965 2D

REICH, B. M.
The Triangle as a Tentative Unit Hydrograph, W75-04239 4A

REICHERTER, U.
Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung), W75-03889 5D

REIKENIS, R.
Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text, W75-04266 5G

REINBOLD, J. R.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues, W75-04034 5C

REYNOLDS, J. H.
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae, W75-04052 5C

Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature, W75-03854 5C

RIBEIRO, C. C.
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity, W75-04161 5C

RICHARDSON, A. C. B.
The Historical Development of Concepts of Radiation Dose Commitment, W75-04153 5C

RIEGER, S.
Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska, W75-04314 2G

ROALES, R. R.
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos, W75-04282 5C

ROBERTS, K.
Microflotation, New-Old Water Purification Technique (Mikroflotation, nygammal vattenreningsteknik), W75-03888 5D

ROBERTSON, G. A.
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L., W75-04011 3F

ROBILLARD, L.
Some Characteristics of Counterjet Flow, W75-04217 5B

ROHWER, P. S.
Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases, W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas, W75-04187 5C

ROMANOV, N. N.
Some Characteristics of Upper Clouds and Suggestions Regarding the Utilization of Radioactive Tracers in Meridional Flows, W75-04059 2B

ROOSENBURG, W. H.
The Thermal Requirements and Tolerances of Key Estuarine Organisms, W75-03944 5C

ROSLYI, E. I.
A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples, W75-04097 5A

ROSYANOV, S. P.
Distribution and Migration of Strontium-90 in Soils, W75-04065 5B

ROTHWELL, D. F.
Conversion of DDT to DDD in Flooded Soil, W75-04348 5B

ROUTSON, R. C.
Experimental Methods for Obtaining Percol Model Input and Verification Data, W75-04276 5B

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems, W75-04271 2F

ROVINSKII, F. Y.
Radioactive Isotopes of Europium Produced by Nuclear Blasts, W75-04058 5A

ROWE, D. W.
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda, W75-04284 5C

RUBLEVSKII, V. P.
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols, W75-04061 5A

RUHE, R. V.
Solid Waste Disposal by Land Burial in Southern Indiana, W75-04035 5B

RUSSEL, M. B.
Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy, W75-04318 3F

RUSSO, E. P.
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A., W75-04256 5B

RUZER, L. S.
Measuring the Concentration of Highly-Disperse Radioactive Aerosols by the Diffusion Method, W75-04094 5A

Spectrometric Method of Measuring the Concentration of Natural Radioactive Aerosols, W75-04098 5A

RYAN, J.
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

RYCHERT, R. C.
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

RYDER, R. A.
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

RYER, F. H.
Exposures to Five Target Health Hazards,
W75-04190 5A

SAHELI, N.
Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

SAKSENA, R. S.
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

SANBORN, W. F.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

SANCHEZ, P. A.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

SANKARAN, K. S.
Mechanistic Response of Expansive Clays,
W75-03955 2G

SARAF, N. H.
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

SAUERLENDER, O. H.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

SAXENA, S. N.
Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

SAY, E. W.
Protecting Creeksheds, Analysis and Action,
W75-03948 4D

Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

SCARAMELLI, A. B.
Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

SCHAUB, S. A.
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

SEELYE, J. G.
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

SEIBERT, D. L. R.
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

SEMAKOVA, L. A.
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

SEN'KO, E. E.
New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

SERNE, R. J.
Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

SEVRUK, B.
The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

SHAFFER, M. J.
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

SHAH, V. L.
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

SHALAVEYUS, S. S.
Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

SHAMBERGER, H. A.
Application of Analog Techniques to Water Management,
W75-04202 6A

The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

SHARMA, A. K.
A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

SHARMA, H. C.
Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

SHARP, J. V. A.
Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

SHARP, W. E.
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

SHINSHI, D.
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

SHIRAZI, M. A.
Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

SHKURATOVA, I. G.
Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

SHOPAUSKENE, D. A.
Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

SHPIRKAUSKAITE, N. K.
Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

SHRADER, W. D.
Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

SHULEPKO, Z. S.
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

SHULTERS, M. V.
Lakes of Oregon: Volume 2. Benton, Lincoln, and Polk Counties,
W75-03968 2H

SHVEDOV, V. P.
Concentration of Phosphorus Radioisotopes in the Ground Layers of the Atmosphere and in Precipitation,
W75-04086 5A

SIERKA, R. A.
A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

SILANT'EV, A. N.
Isotope Analysis of Radioactive Fallout and Aerosol Samples by Beta-Spectrometry,
W75-04099 5A

A Simple Two-Dimensional Analyzer of Beta-Gamma Coincidences in the Study of Radioactive Fallout Samples,
W75-04097 5A

SILOS, J. S.
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

SIMONSON, G. H.
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

SIMPSON, S.
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

SINGH, A.
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

SINGH, AMBIKA
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

SINGH, B. P.
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

SINGH, R. C.
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

SINGH, R. M.
Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

SINGH, S. D.
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

SINGH, T. A.
Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

SINGHLA, S. K.
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

SISIGINI, T. I.
Assessment of Radon Emanation from the Surface of Extensive Territories,
W75-04090 5B

SITALO, E. A.
Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

SKINNER, E.
Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

SKITOVICH, V. I.
Development of a Method for Determining the Size Distribution of Radioactive Aerosols with the Aid of Filtering Materials,
W75-04092 5A

Filtering Aerosols with Natural Atmospheric Radioactivity Through Fibrous Materials,
W75-04091 5A

SKOGLUND, T.
Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

SKUJINS, J.
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

SLADE, S. K.
Conservation and Flooding Easements: A Case Study,
W75-04211 6E

SLATE, J. E. JR.
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

SLOTTA, L. S.
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

SLY, P. G.
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

SMITH, J. O.
Law, (Literature Review),
W75-04020 5G

SNYDER, W. S.
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

SOKOLOVA, A. A.
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

SOLOV'EV, V. P.
Rapid System of Automatic Punch-Tape Output of Information from the AI-100-1 Analyzer,
W75-04100 5A

SOLTIS, R. G.
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

SONENBLUM, S.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

SONTHEIMER, H.
Studies on the Use of Ozone in Water and Waste Water Purification (Untersuchungen zur Anwendung von Ozon bei der Waser- und Abwasserreinigung),
W75-03889 5D

SORBER, C. A.
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

SOUTH, C.
Operational Aspects of Urban Sewage Works,
W75-04114 5D

SPAIN, J. D.
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

STAFFORD, D. B.
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

STANBURY, P. S.
Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

STAPLES, K. D.
Investigation for the Marine Disposal of Effluents,
W75-04289 5B

STARIKOV, B. G.
Separate Determination of Rn, RaA, RaB, and RaC Concentrations in Air from the Alpha-Activity Decay Curve of a Filter,
W75-04095 5A

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

STARR, J. D.
How Chicago Manages its Distribution System,
W75-04197 6C

STECKEL, F.
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

STEFAN, H.
Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

STEPHENS, L. D.
Population Exposure from High-Energy Accelerators,
W75-04183 5C

STOCKER, Z. S. J.
Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

STONE, L. R.
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

STOTZKY, G.
Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

STRAUSS, A. M.
The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

STREEB, J.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

STROBAND, H. J.
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

STRONG, A. L.
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

STROUD, A.
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

STYRO, B. I.
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

Long-Lived Alpha-Radioactivity in Fallout at Vilnius and at Various Atlantic Latitudes,
W75-04083 5A

New Methods of Measuring Rn220 (Thoron) Exhalation and Some Results,
W75-04096 5A

Polonium-210 in the Atmosphere and its Ratio to Lead-210,
W75-04088 5A

Some Features of Atmosphere Cleansing by Ground Condensation,
W75-04078 5A

SUGAWARA, N.
Effects of Phthalate Esters on Shrimp,
W75-04285 5C

SUROTKEVICHIENE, R.
State of Strontium-90, Cesium-137, and Cerium-144 in Radioactive Fallout,
W75-04071 5B

SUTABUTR, P.
The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

SWANSON, E. R.
Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

SWEENEY, R. A.
Rejuvenation of the Buffalo River,
W75-04248 5C

SWENSON, F. A.
Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

TALLEY, W. J. JR.
New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

TALLIS, J. A.
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

TARASOV, S. I.
Relation Between Atmospheric Precipitation Washout of Radio-Activity and Nonactive Ions,
W75-04079 5B

TELL, R. A.
The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

TELLER, H. L.
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

TELUSHKINA, E. L.
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

TENNEY, M. W.
Mixing in Anaerobic Digestion,
W75-04120 5D

TEOTIA, M.
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

TEOTIA, S. P. S.
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

TER-SAAKOV, A. A.
The Atmospheric Formation of Secondary Aerosols During Ventilated Underground Nuclear Tests,
W75-04069 5B

Formation of Radioactive Particles During Nuclear Bursts in the Troposphere,
W75-04067 5B

TERRY, D. L.
Influence of Tobacco Plant Canopy on Percolation,
W75-03931 3F

THOMAS, B. R.
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

THOMAS, G. W.
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

THOMAS, R. H.
Population Exposure from High-Energy Accelerators,
W75-04183 5C

THOMAS, S. B.
Population Exposure from High-Energy Accelerators,
W75-04183 5C

THOMAS, W. H.
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

THOMSEN, K. O.
A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

THORUD, D. B.
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

TIERNAN, M. W.
Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

TOMPKINS, P. C.
The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

TORELLI, L.
CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

TOULEMONDE, M.
Biological Purification of Effluents from Bleached Kraft Pulp: The Case of La Cellulose Des Ardennes (Epuration biologique d'effluents de pate Kraft blanchie: Le cas de la Cellulose des Ardennes),
W75-03895 5D

TRELEASE, F. J.
The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

TRIVETT, N. B. A.
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

TROITSKAYA, M. N.
Cesium-137, Strontium-90, and Lead-210 in Soil of the Far North Regions,
W75-04063 5B

TRUFAKIN, V. A.
Time Fluctuations of Lead-210 Concentration in the Ground Layer of the Atmosphere,
W75-04089 5A

Utilization of Natural Radioactive Substances in the Study of Turbulent Exchange and Atmospheric Scavenging by Means of Ground Measurement,
W75-04077 5B

TSAI, K. C.
Pollution Potential of Aquatic Sediments,
W75-04150 5B

TSAI, Y. J.
Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

TSAO, K. C.
Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

TSE, A. N.
Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

TSEVELEV, M. A.
Determination of Radioisotope Fallout From Its Content in Chronological Layers of High-Altitude Glaciers,
W75-04057 5A

TUNNY, J.
The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

TYURYUKANOVA, E. B.
Accumulation of Strontium-90 in Soils,
W75-04062 5B

ULLERY, S. J.
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

UNZ, R. F.
Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

UPCHURCH, W. J.
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

VAN DER BURGH, P.
Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

VAN DER KUUR, P.
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

VAN DER SLOOT, H. A.
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

VAN DER WEIDE, J.
Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

VAN REES, A. J.
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

VASIL'EVA, N. V.
Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

VEBRENE, B. K.
Distribution of Raindrops with Respect to Specific Radioactivity,
W75-04073 2B

VENKATESHWAR, RAO D.
Mechanistic Response of Expansive Clays,
W75-03955 2G

VERBOOM, G. K.
Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

VERGARA, R.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

VERHOFF, F. H.
Mixing in Anaerobic Digestion,
W75-04120 5D

VICINI, L.
Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

VIESSMAN, W. JR.
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

VILENSKII, V. D.
Radium-226 in Atmospheric Precipitation, and the Possibilities for Lead-210, Bismuth-210 and Polonium-210 to Penetrate the Atmosphere from the Earth's Surface,
W75-04087 5A

VINOGRADOVA, V. K.
Distribution and Migration of Strontium-90 in Soils,
W75-04065 5B

VODOVOZOVA, I. G.
Horizontal Water Migration of Strontium-90,
W75-04066 5B

VOLOKITINA, L. A.
Vertical Distribution of Radioactive Aerosols in the Troposphere Over the European USSR in 1964-1967,
W75-04055 5B

VYAS, D. L.
Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

WACHSMUTH, W. A.
Apparatus for Separating Solids from Liquids,
W75-03866 5D

WAITE, T. D.
Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

WALDRIP, D. B.
Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

WALLACE, R. G.
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

WANG, W-C,
Effect of Turbidity on Algal Growth,
W75-04306 5C

WARD, J. R.
Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

WARNER, G. G.
Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

WARRACK, A. W.
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

WEIDNER, C. W.
Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

WEISS, C. M.
Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

WELTY, C. G. JR.
Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

WENDELL, M.
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

WHITHED, M. H.
Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

WILDING, L. P.
Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

WILEY, A. J.
Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

WILKIE, W. H.
The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

WILLIS, R.
The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

WINDHAM, S. T.
An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

WITHERSPOON, J. P.
Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Popu-

lation Doses Following Cessation of Plant Operations,
W75-04167 5B

WOLF, D.
Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

WOLF, D. A.
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

WOLKOFF, A. A.
A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

WOODIWISS, F. S.
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

WRIGHT, B. A.
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

WRIGHT, J.
Filtration - Media Selection is the Key to Success,
W75-03943 5F

WU, D. S.
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

WU, I-P.
Design of a Conduit System with Diverging Branches,
W75-03930 8A

WU, Y. C.
Improved Clarification of Book Mill Effluent,
W75-03902 5D

YANG, K-P.
Design of a Conduit System with Diverging Branches,
W75-03930 8A

YASYULENIS, R. Y.
Argon Spallation Yields of Cosmogonic Radioisotopes,
W75-04082 5B

Concentration of Sodium Radioisotopes in the Ground Layer of the Atmosphere and in Precipitation,
W75-04085 5A

Cosmogonic Sodium-22 and Beryllium-7 Isotopes in Investigations of Atmospheric Dynamics,
W75-04081 5B

YEE, M. S.
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

YEH, W. W-G.
Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

YERMANOS, D. M.
Agronomic Survey of Jojoba in California,
W75-03960 3F

YOMTOVIAN, I.
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

YOUNG, C. E.
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

YOUNG, R. A.
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

YUSHKAN, E. I.
Radioactive Isotopes of Europium Produced by Nuclear Blasts,
W75-04058 5A

ZHILKINA, M. I.
Fallout and Accumulation of Radioactive Decay Products in 1966-1968 in the Vicinity of Leningrad,
W75-04103 5B

ZIMINA, L. A.
Study of the Resistance of Fibrous Filtering Materials in Rarefied Air,
W75-04105 5A

ZIMMERER, A. L.
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

ZIMMERER, B. J.
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

ZIMMERER, P. B.
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

ZIRZOW, C. F.
A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

ZITKO, V.
Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

ZYKOVA, A. S.
Rate of Atmospheric Fallout of Cesium-137 and Strontium-90 Aerosols,
W75-04061 5A

ORGANIZATIONAL INDEX

AEROJET ELECTROSYSTEMS CO., AZUSA, CALIF.
Development of a Prototype Airborne Oil Surveillance System - Volume I - System Definitions Studies.
W75-04259 5A

AGRICULTURAL RESEARCH SERVICE, BIG SPRING, TEX.
Effect of Tractor Traffic, Surface Mulch and Seedbed Configuration on Soil Properties,
W75-04316 3F

AGRICULTURAL RESEARCH SERVICE, BRAWLEY, CALIF. IMPERIAL VALLEY CONSERVATION RESEARCH CENTER.
Deterioration of Concrete Ditch Liners in Saline-Alkali Soil,
W75-03966 8F

AGRICULTURAL RESEARCH SERVICE, FLORENCE, S.C. COASTAL PLAINS SOIL AND WATER CONSERVATION RESEARCH CENTER.
Flue-Cured Tobacco Yield and Oxygen Content of Soil in Lysimeters Flooded for Various Periods,
W75-04111 3F

AGRICULTURAL RESEARCH SERVICE, LOGAN, UTAH.
Isolated Soil Columns for Plant Research: Procedure and Uniformity Trial,
W75-04321 3F

AGRICULTURAL RESEARCH SERVICE, PENDLETON, OREG. COLUMBIA PLATEAU CONSERVATION RESEARCH CENTER.
Corn Root-Configuration Response to Soil Temperature and Matric Suction,
W75-04288 3F

AGRICULTURAL RESEARCH SERVICE, PHOENIX, ARIZ., WATER CONSERVATION LAB.
The Three Stages of Drying A Field Soil,
W75-03965 2D

AGRICULTURAL RESEARCH SERVICE, RIVERSIDE, CALIF. SALINITY LAB.
Steady Flows of Water and Salt in Uniform Soil Profiles with Plant Roots,
W75-03956 2I

ALFA-LAVAL PTY. LTD. (AUSTRALIA). INDUSTRIAL DIV.
Solving Effluent Problems by the Use of Centrifuges,
W75-03942 5D

ALTAMAHA GEORGIA SOUTHERN AREA PLANNING AND DEVELOPMENT COMMISSION, BAXLEY, GA.
Water and Sewer Management Study, Altamaha Georgia Southern Area.
W75-04196 5G

AMERICAN INSURANCE ASSOCIATION, WASHINGTON, D.C.
Exposures During The Transportation of Radioactive Materials,
W75-04189 5C

AMOCO PRODUCTION CO., TULSA, OKLA. (ASSIGNEE)
Use of Sulfur for Combatting Oil Spills,
W75-03869 5G

AQUA-CHEM, INC., MILWAUKEE, WIS. (ASSIGNEE)
Milti-Stage Flash Evaporator,
W75-03860 3A

ARGONNE NATIONAL LAB., ILL.
Thermal Pollution of the Great Lakes -- A Non-Problem,
W75-04231 5B

ARIZONA STATE FUEL AND ENERGY OFFICE, PHOENIX. CONSERVATION SECTION.
Putting the Sun to Work: A History and Directory of Currently Available Solar Energy Applications,
W75-04128 3A

ARIZONA UNIV., TUCSON. DEPT. OF ANTHROPOLOGY.
Irrigation's Impact on Society.
W75-04138 3F

ARIZONA UNIV., TUCSON. DEPT. OF GEOSCIENCES.
The Hydraulic Geometry of a Discontinuous Ephemeral Stream in a Bajada Near Tucson, Arizona,
W75-04125 2E

Hydrogeology of the Carefree Ranch Area, Maricopa County, Arizona,
W75-04145 2F

ARIZONA UNIV., TUCSON. DEPT. OF NUCLEAR ENGINEERING.
A Combined System Concept for Power Generation and Wastewater Renovation,
W75-04227 5D

ARIZONA UNIV., TUCSON, DEPT. OF SOILS, WATER, AND ENGINEERING.
Two-Dimensional Displacement Into or from Water-Filled Ditches,
W75-03957 4A

ARIZONA UNIV., TUCSON. DEPT. OF WATERSHED MANAGEMENT.
Vegetation Management for Increased Water Yield in Arizona,
W75-03961 3B

ARIZONA UNIV., TUCSON. INST. OF GOVERNMENT.
Institutional Fragmentation and Policy Innovation: The Case of Federal Water Pollution Control,
W75-03851 5G

ARIZONA UNIV., TUCSON. LAB. OF TREE-RING RESEARCH.
Relationships of Ring Widths in Arid-Site Conifers to Variations in Monthly Temperature and Precipitation,
W75-03964 2I

ARKHANGELSKII LESOTEKHNICHESKII INSTITUT (USSR).
On the Sorption Capacity of Lignin for the Easy- and Difficult-To-Oxidize Components or Residual Liquor from Yeast Production (O sorptsionnoi emkosti lignina po legko- i trudnookislyaemym komponentam posledrozhzhevoi brazhki),
W75-03896 5D

ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Industrial Wastewaters, Red River Army Depot, Texarkana, Texas,
W75-04263 5D

ARMY ENGINEER DISTRICT, MOBILE, ALA.
Special Flood Hazard Information Report: Yockanookany River, Dye Ditch and Munson Creek, Kosciusko, Attala County, Mississippi.
W75-04204 4A

Flood Plain Information: Choctawhatchee River, Pea River, Double Bridges Creek, City of Geneva, Alabama.
W75-04212 4A

ARMY ENGINEER DISTRICT, NEW ORLEANS, LA.
Water Quality Aspects of the 1973 Opening of the Mississippi River Diversion Spillway at Bonnet Carre, Louisiana, U.S.A.,
W75-04256 5B

ARMY ENGINEER DISTRICT, NORFOLK, VA.
Flood Plain Information: North Run, Henrico County, Virginia,
W75-04208 2E

Flood Plain Information: Gillies Creek, Henrico County, Virginia,
W75-04209 2E

ARMY ENGINEER DISTRICT, SACRAMENTO, CALIF.
Flood Plain Information: Jordan River Complex II, Midvale-Draper, Utah.
W75-04205 4A

ARMY ENGINEER TOPOGRAPHIC LAB., FORT BELVOIR, VA.
Worldwide Distributions of Mean Monthly Dewpoint,
W75-04130 2A

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS. OFFICE OF DREDGED MATERIAL RESEARCH.
Sulfate Reduction and Sulfide Oxidation in Flooded Soil as Affected by Chemical Oxidants,
W75-04347 5B

ARMY MEDICAL ENVIRONMENTAL ENGINEERING RESEARCH UNIT, EDGEWOOD ARSENAL, MD.
Problem Definition Study: Evaluation of Health and Hygiene Aspects of Land Disposal of Wastewater at Military Installations,
W75-04015 5D

ATOMIC ENERGY COMMISSION, NEW YORK, NEW YORK, HEALTH AND SAFETY LABORATORY.
Determination of Gamma-Ray Exposure in the Vicinity of a Boiling Water Power Reactor,
W75-04168 5A

BANGLADESH AGRICULTURAL UNIV., MYMENSINGH. DEPT. OF SOIL SCIENCE.
Conversion of DDT to DDD in Flooded Soil,
W75-04348 5B

BARRIER FILTERS PTY. LTD. (AUSTRALIA).
Filtration - Media Selection is the Key to Success,
W75-03943 5F

BATTELLE-PACIFIC NORTHWEST LABS., RICHLAND, WASH. WATER AND LAND RESOURCES DEPT.
Methods for Estimating Transport Model Parameters for Regional Groundwater Systems,
W75-04271 2F

Experimental Methods for Obtaining Percol Model Input and Verification Data,
W75-04276 5B

BEDFORD INST., DARTMOUTH (NOVA SCOTIA).
Run-Off Regulation of the St. Lawrence and Its Liability,
W75-04243 4A

BONNEVILLE POWER ADMINISTRATION, PORTLAND, OREG.
Open Channel Flow Evaporation Study,
W75-04273 2D

BRISTOL AVON RIVER AUTHORITY (ENGLAND).
Quality Control in River Management of the Bristol Avon,
W75-04324 5G

BROOKHAVEN NATIONAL LAB., UPTON, N.Y.
As Low as Practicable: A Critical Appraisal of Population Health Risks from Power Plant Effluents,
W75-04163 5A

Health Effects of Fossil Fuel Power Plants,
W75-04180 5C

BUREAU OF LAND MANAGEMENT, PORTLAND, OREG.
Evaluation of Criteria for Separating Soils with Xeric and Udic Moisture Regimes,
W75-04312 2G

BUREAU OF RECLAMATION, DENVER, COLO. ENGINEERING AND RESEARCH CENTER.
Nitrification in Soil-Water Systems: A Computerized Activated Complex Model,
W75-04235 5B

BUREAU OF RECLAMATION, DENVER, COLO. LOWER MISSOURI REGION.
The Elements of Carrying Capacity in the Recreation Utilization of Reservoirs,
W75-04249 6B

BURLINGTON (ONTARIO). CANADA CENTRE FOR INLAND WATERS.
A Summary and Comparison of Nutrients and Related Water Quality in Lakes Erie, Ontario, Huron, and Superior,
W75-04027 5B

CALIFORNIA STATE UNIV., SAN JOSE. DEPT. OF NATURAL SCIENCE.
A Drift Card Study in Monterey Bay, California: September 1971 to April 1973,
W75-04279 2L

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Population Exposure from High-Energy Accelerators,
W75-04183 5C

CALIFORNIA UNIV., BERKELEY. OPERATIONS RESEARCH CENTER.
Identification of a Distributed Parameter System in Hydrology,
W75-04280 2F

CALIFORNIA UNIV., BERKELEY. SCHOOL OF FORESTRY AND CONSERVATION.
Usefulness of ERTS-1 and Supporting Aircraft Data for Monitoring Plant Development and Range Conditions in California's Annual Grassland,
W75-03990 4A

CALIFORNIA UNIV., DAVIS.
Rise and Decline of the Water Table Induced by Vertical Recharge,
W75-04333 2F

Models of Dispersion in a Granular Medium,
W75-04340 2F

CALIFORNIA UNIV., DAVIS. DEPT. OF CIVIL ENGINEERING.
Applications of Systems Analysis to International Water Resources Projects,
W75-04232 6A

CALIFORNIA UNIV., LOS ANGELES. DEPT. OF ENGINEERING SYSTEMS.
Optimization of Real Time Operation of a Multiple-Reservoir System,
W75-03935 4A

CALIFORNIA UNIV., LOS ANGELES. INST. OF GOVERNMENT AND PUBLIC AFFAIRS.
Some Political and Economic Aspects of Managing California Water Districts,
W75-03856 6B

CALIFORNIA UNIV., RIVERSIDE. DEPT. OF PLANT SCIENCES.
Agronomic Survey of Jojoba in California,
W75-03960 3F

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA. INST. OF MARINE RESOURCES.
Phytoplankton Enrichment Experiments and Bioassays in Natural Coastal Sea Water and in Sewage Outfall Receiving Waters Off Southern California,
W75-04283 5C

CANADA CENTRE FOR INLAND WATERS, BURLINGTON (ONTARIO).
A Highly Sensitive Technique for the Liquid Chromatographic Analysis of Phenols and Other Environmental Pollutants,
W75-03911 5A

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO. DEPT. OF SYSTEMS ENGINEERING.
Integrated System Identification and Optimization for Conjunctive Use of Ground and Surface Water, Phase II,
W75-03853 4B

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO. SEARS LIBRARY.
Setting up a Special Collection on Water Pollution in a University Library,
W75-04118 5G

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO. SYSTEMS ENGINEERING DIV.
Mathematical Modelling and Identification of Thermal Pollution in Streams: A Review Paper,
W75-04230 5B

CATHOLIC UNIV. OF AMERICA, WASHINGTON, D.C. INST. OF SOCIAL AND BEHAVIORAL RESEARCH.
Evaluation of Interregional Input-Output Models for Potential Use in the McClellan-Kerr Arkansas River Multiple Purpose Project Impact Study,
W75-03923 4A

CENTRAL ARID ZONE RESEARCH INST., JODHPUR (INDIA).
Some Socio-Agricultural Changes as a Result of Introduction of Irrigation in a Desert Region,
W75-03951 3F

Distribution of Humus and Avalable Nutrients in Soil Under Sown Pastures in an Arid Environment,
W75-03958 3F

CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR (INDIA).
Some Considerations on Plant Types for Dryland Agriculture,
W75-04126 2I

Studies of Tillage-Fertility on Pearl Millet in Sandy Arid Plains of Rajasthan,
W75-04129 3F

CENTRAL INLAND FISHERIES RESEARCH INST., BARRACKPORE (INDIA).
Biological Processes Involved in Pollution of Coastal Aquaculture Waters,
W75-04281 5C

CENTRAL SOIL SALINITY RESEARCH INST., KARNAL (INDIA).
Distribution of Boron in Salt Affected and Contiguous Normal Soils,
W75-04141 2G

CENTRO DI RICERCA IBM DI VENEZIA (ITALY).
Second-Order Theory of Flow in Three-Dimensional Deforming Media,
W75-04308 2F

CHICAGO DEPT. OF WATER AND SEWERS, ILL.
How Chicago Manages its Distribution System,
W75-04197 6C

CINCINNATI UNIV., OHIO. DEPT. OF ENGINEERING ANALYSIS.
The Nonlinear Rainfall Response of Watersheds With Time Dependent Storage and Conveyance Properties,
W75-04240 2A

CLEMSON UNIV., S. C. DEPT. OF CIVIL ENGINEERING.
Determining Land Use Changes in Watersheds by Aerial Photographic Measurements,
W75-04051 4C

COLORADO DIV. OF WILDLIFE, FORT COLLINS. FISHERIES RESEARCH CENTER.
Acute Toxicity of a Zinc-Polluted Stream to Four Species of Salmonids,
W75-04287 5C

COLORADO STATE UNIV., FORT COLLINS. DEPT. OF EARTH RESOURCES.
General Disposition and Aquatic Environmental Effects of Silver Iodide in Precipitation Management,
W75-04255 3B

COMMONWEALTH EDISON CO., CHICAGO, ILL.
A Review of Effluents, General Population Doses, and Occupational Doses Resulting from Commonwealth Edison's Use of Nuclear Power,
W75-04164 5B

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, CANBERRA (AUSTRALIA). DIV. OF PLANT INDUSTRY.
Application of Surface Moderators to Measurement of Water Content in Field Topsoils with a Neutron Moisture Depth Gauge,
W75-03940 2G

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, CLAYTON (AUSTRALIA). DIV. OF CHEMICAL PHYSICS.
Monitor for the Quality of Australia's Water Resources,
W75-03939 5A

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, DENILIQUIN (AUSTRALIA). DIV. OF PLANT INDUSTRY.
The Effect of Gypsum Treatment on the Swelling of Natural Clods of a Clay Soil,
W75-04132 2G

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, MORDIALLC (AUSTRALIA). DIV. OF ATMOSPHERIC PHYSICS.
An Energy Partition Evaporation Recorder,
W75-03937 2D

CORNELL UNIV., ITHACA, N.Y. DEPT. OF ENVIRONMENTAL ENGINEERING.
Kinetics of Microbiologically Mediated Transformations of Heavy Metals in Aquatic Environments,
W75-03945 5B

CORNELL UNIV., ITHACA, N.Y. DEPT. OF OPERATIONS RESEARCH.
Methodologies for Operating Reservoirs for Short-Term Flood Control,
W75-03855 4A

DELAWARE RIVER BASIN COMMISSION, TRENTON, N.J.
Standards, Administration, and Surveys, (Literature Review),
W75-04014 5G

DELAWARE UNIV., NEWARK; AND ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, PA.
The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects. Annex to Volume I. Management Agency Problems in the Delaware Estuary,
W75-04328 6F

DELTA WORKS, THE HAGUE (NETHERLANDS). HYDRAULICS DIV.; AND WATERLOOPKUNDIG LABORATORIUM, DELFT (NETHERLANDS).
Experiences with Tidal Salinity Model Europoort,
W75-03927 8B

DEPARTMENT OF AGRICULTURE, HARROW (ONTARIO). RESEARCH STATION.
Use of Black Polyethylene Mulch to Reduce Flooding Effects on Tomato Yields,
W75-04030 3F

DEPARTMENT OF THE ENVIRONMENT, OTTAWA, (ONTARIO). MARINE SCIENCES DIRECTORATE.
Data Collection and Analysis Techniques for Global Marine Pollution Studies,
W75-04236 5A

DEPARTMENT OF THE ENVIRONMENT, READING (ENGLAND). WATER DATA UNIT.
The Ultrasonic Method of River Gauging,
W75-04026 4A

DEPARTMENT OF WATER AFFAIRS, ORANIA (SOUTH AFRICA).
Mechanics of Dispersion of Pollutants in Coastal Environment,
W75-04237 5B

DIVISION OF OPERATIONAL SAFETY (AEC), WASHINGTON, D.C.
Assessment of Public Radiation Exposure in the Vicinity of U.S. Aec Sites,
W75-04194 5A

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C. SAVANNAH RIVER LAB.
Determination of Parts Per Billion Sulfide in Water with the Sulfide-Selective Electrode,
W75-04021 5A

EASTERN ENVIRONMENTAL RADIATION FACILITY, MONTGOMERY, ALA.
Low Level Population Exposure Measurements Using Thermoluminescent Dosimeters,
W75-04178 5A

An Examination of Design Parameters in a Field Study for Exposure Evaluation,
W75-04192 5A

EBASCO SERVICES, INC., NEW YORK.
Progress in Satisfying Environmental Requirements,
W75-04018 5G

ECODYNE CORP., CHICAGO, ILL. (ASSIGNEE)
Apparatus for Separating Solids from Liquids,
W75-03866 5D

ECOLE POLYTECHNIQUE, MONTREAL (QUEBEC).
Evaluating Multireservoir Operating Rules,
W75-03932 4A

EDAW, INC., SAN FRANCISCO, CALIF.
Surface Water Data of the Upper Michigan Region Project Sanguine, Site Study.
W75-04277 2E

EG AND G, INC., LAS VEGAS, NEV.
Population Exposure to Natural Terrestrial Gamma Radiation Around Selected Nuclear Power Plant Sites,
W75-04193 5A

EIDGENOESSISCHE TECHNISCHE HOCHSCHULE, ZURICH (SWITZERLAND). VERSUCHSANSTALT FUER WASSERBAU, HYDROLOGIE UND GLAZIOLOGIE.
The Use of Stereo, Horizontal, and Ground Level Orifice Gages to Determine a Rainfall-Elevation Relationship,
W75-04330 2B

ENTE NATIONALE PER L'ENERGIA ELETTRICA, FLORENCE (ITALY). COMPARTIMENTO DI FIRENZE.
Thermal Pollution Aspects in Europe,
W75-04226 5B

ENVIRONMENTAL DEFENSE FUND, WASHINGTON, D.C. WATER RESOURCES PROGRAM.
Is the Water Safe to Drink. Part 3: What You Can Do,
W75-04019 5F

ENVIRONMENTAL PREDICTION RESEARCH FACILITY (NAVY), MONTEREY, CALIF.
Computation of Tides, Currents, and Dispersal of Pollutants in the New York Bight from Block Island to Atlantic City with Large Grid Size, Single and Two-Layer Hydrodynamical-Numerical Models, Part 4,
W75-04262 5B

ENVIRONMENTAL PROTECTION AGENCY, CINCINNATI, OHIO.
Direct Analysis of Water Samples for Organic Pollutants With Gas Chromatography/Mass Spectrometry,
W75-03910 5A

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
The Use and Misuse of Population Exposures in Radiation Protection,
W75-04154 5C

ENVIRONMENTAL PROTECTION AGENCY, SEATTLE, WASH. REGION X.
Guidelines for Preparation of Environmental Statements for Reviewing and Commenting on Environmental Statements by Other Federal Agencies.
W75-04010 6G

ENVIRONMENTAL PROTECTION SERVICE, OTTAWA (ONTARIO).
Study of the Seasonal Effects on the Microbiology of a Northern Pulp and Paper Mill Aeration Lagoon,
W75-03916 5D

ENVIRONMENTS FOR TOMORROW, INC., MCLEAN, VA.
Management of Water Resources for Urban Environmental Enhancement,
W75-04151 6B

ESSO RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Disposal/Recycle Management System Development for Air Force Waste Petroleum Oils and Lubricants.
W75-04268 5E

FEDERAL POWER COMMISSION, WASHINGTON, D.C. BUREAU OF POWER.
Water Resources Appraisal for Hydroelectric Licensing, The Clarion River Basin, Pennsylvania.
W75-04274 6G

FINNISH PULP AND PAPER RESEARCH INST., HELSINKI.
Use of Waste Chemicals in Kraft Mill Effluent Treatment,
W75-03891 5D

FISHERIES RESEARCH BOARD OF CANADA, ST. ANDREWS (NEW BRUNSWICK). BIOLOGICAL STATION.
Uptake of Chlorinated Paraffins and PCB from Suspended Solids and Food by Juvenile Atlantic Salmon,
W75-04286 5C

FOREST SERVICE (USDA) CORVALLIS, OREG. FORESTRY SCIENCES LAB.
The Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD) in Guppies (Poecilia Reticulatus Peters),
W75-04028 5C

FOREST SERVICE (USDA), OGDEN, UTAH. INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION.
More Streamflow After a Bark Beetle Epidemic,
W75-04342 4C

GEOLOGICAL SURVEY, ANCHORAGE, ALASKA.
Preconstruction Assessment of Biological Quality of the Chena and Little Chena Rivers in

GEOLOGICAL SURVEY, ANCHORAGE, ALASKA.

the Vicinity of Chena Lakes Flood Control Project Near Fairbanks, Alaska,
W75-03988 5B

GEOLOGICAL SURVEY, ATLANTA, GA.
Use of Water in Georgia, 1970, with Projections to 1990,
W75-03983 6D

Geology and Ground-Water Resources of Gordon, Whitfield, and Murray Counties, Georgia,
W75-03984 2F

GEOLOGICAL SURVEY, CARSON CITY, NEV.
The Story of Wonder, Churchill County, Nevada,
W75-03985 3E

GEOLOGICAL SURVEY, DENVER, COLO.
Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming,
W75-03972 4B

GEOLOGICAL SURVEY, EL PASO, TEX.
Quality and Availability of Water in Westernmost Texas,
W75-03979 2K

GEOLOGICAL SURVEY, HELENA, MONT.
Shallow Ground Water in Selected Areas in the Fort Union Coal Region.
W75-03974 5B

Water-Resources Investigations of the U.S. Geological Survey in the Northern Great Plains Coal Region of Eastern Montana, 1974-75.
W75-03977 7C

GEOLOGICAL SURVEY, LAS VEGAS, NEV.
Water-Resources Data Collected in the Devils Hole Area, Nevada, 1973-74,
W75-03978 7C

GEOLOGICAL SURVEY, LAWRENCE, KANS.
Geohydrology of Nemaha County, Northeastern Kansas,
W75-03986 2F

Geology and Ground-Water Resources of Montgomery County, Southeastern Kansas,
W75-03987 2F

GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Hydrologic Analysis of the Mojave River, California, Using a Mathematical Model,
W75-03967 4A

Geohydrologic Map of Southern California,
W75-03973 7C

Limnological Data from Selected Lakes in the San Francisco Bay Region, California,
W75-03975 2H

Special Techniques for Determining Chemical Properties of Geothermal Water,
W75-03980 2K

Flood-Hazard Study--100-Year Flood Stage for Baldwin Lake, San Bernardino County, California,
W75-03981 2H

Limnological Study of Lake Shastina, Siskiyou County, California,
W75-03982 2H

GEOLOGICAL SURVEY, PORTLAND, OREG.
Lakes of Oregon: Volume 2. Benton, Lincoln, and Polk Counties,
W75-03968 2H

Crest-Stage Gaging Stations in Oregon--A Compilation of Peak Data Collected from October 1952 to September 1974,
W75-03969 7C

GEOLOGICAL SURVEY, RESTON, VA.
The Processing and Storage of Water-Quality Data in the National Water Data Storage and Retrieval System,
W75-03970 7C

GEOLOGICAL SURVEY, TALLAHASSEE, FLA.
The Observation-Well Network of the U.S. Geological Survey in Florida,
W75-03971 7C

Hydrologic Data for 1973, Broward County, Florida,
W75-03976 3B

GEORGIA INST. OF TECH., ATLANTA. OFFICE OF INTERDISCIPLINARY PROGRAMS.
Radiation Dose From Natural Gas vs. That From Nuclear Stimulated Natural Gas,
W75-04185 5A

GEORGIA INST. OF TECH., ATLANTA. SCHOOL OF CIVIL ENGINEERING.
Heat Dissipation from Turbulent Open Channel Flow,
W75-04350 5B

GEORGIA INST. OF TECH., ATLANTS. OFFICE OF INTERDISCIPLINARY PROGRAMS.
Consideration of Background in Development of Environmental Standards,
W75-04155 5G

GEORGIA UNIV., ATHENS. INST. OF GOVERNMENT.
Law, (Literature Review),
W75-04020 5G

GHENT RIJKSUNIVERSITEIT (BELGIUM). SOIL PHYSICS, SOIL CONDITIONING AND HORTICULTURAL SOIL SCIENCES LAB.
Dune Sand Stabilization with Synthetic Soil Conditioners: A Laboratory Experiment,
W75-03953 2G

GOVERNMENT INDUSTRIAL RESEARCH INST., TAKAMATSU (JAPAN).
The Attempts to Modify the Activated Sludge Process in Sulphate Pulp Waste Water (In Japanese),
W75-03882 5D

Studies of Renovation of Pulp Mill Waste Water; The Conditions of the Percolation Through Activated Carbon Column for Kraft Pulp Lignin (In Japanese),
W75-03883 5D

GREEN ASSOCIATES, INC., TOWSON, MD.
Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability; Volume I: Main Text,
W75-04266 5G

GUJARAT SOIL CONSERVATION RESEARCH, DEMONSTRATION AND TRAINING CENTRE, VASAD (INDIA).
Preliminary Study on Movement of Available Water in Sandy Loam Soils Under Dry Farming Conditions,
W75-04133 3F

HAIFA UNIV. (ISRAEL).
Attitudes Toward Payment for Resource Use: The Case of Domestic Water Consumption,
W75-04201 6C

HARYANA AGRICULTURAL UNIV., HISSAR (INDIA).
Effect of Soil Moisture Regimes, Phosphorus and Nitrogen on N and P Uptake by Barley (Hordeum Vulgare L.),
W75-03991 3F

HAWAII INST. OF GEOPHYSICS, HONOLULU.
Classic Canal Theory with Graphs and Tables. Volume I,
W75-04269 8B

Classical Canal Theory with Graphs and Tables. Volume II,
W75-04270 8B

HAWAII UNIV., HONOLULU. SEA GRANT PROGRAM.
Aquatic Survey of the Kona Coast Ponds, Hawaii Island,
W75-04275 2L

HEALTH AND SAFETY LAB. (AEC), NEW YORK.
Data Needs for the Assessment of Population Dose From Background Radiation,
W75-04156 5A

HEALTH PHYSICS SOCIETY, EAST WEYMOUTH, MASS.
Symposium on Population Exposures,
W75-04152 5C

The Use of Environmental Monitoring Data in Determining Background Radiation Doses,
W75-04158 5A

HEBREW UNIV., JERUSALEM (ISRAEL). GRADUATE SCHOOL OF APPLIED SCIENCE AND TECHNOLOGY.
Interfacing Newly Developed Technology Within Present Wastewater Treatment Trains,
W75-04325 5D

HENRY (J.J.) CO., INC., MOORESTOWN, N.J.
An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972.
W75-04260 5B

HERCULES INC., WILMINGTON, DEL.
An Overloaded Sludge Plant. Try Chemical Treatment,
W75-04123 5D

HOWARD, NEEDLES, TAMMEN, AND BERGENDOFF, ALEXANDRIA, VA. DEPT. OF ENVIRONMENTAL QUALITY AND CONSERVATION.
A Positive Look at Achievements in Water Quality Enhancement,
W75-04247 5G

HURON RIVER WATERSHED COUNCIL, ANN ARBOR, MICH.
Protecting Creeksheds: Development and Evaluation of a Method to Manage Small, Urbanizing Watersheds Through Local Government Actions,
W75-03947 4D

Protecting Creeksheds, Analysis and Action,
W75-03948 4D

HYDROBIOLOGICAL RESEARCH INST., JYVASKYLA (FINLAND).
The Eutrophication and Pollution of Lake Paijanne, Central Finland,
W75-04264 5C

HYDROMETEOROLOGICAL SERVICE OF THE USSR, MOSCOW.
Nuclear Meteorology,
W75-04054 5B

IDAHO UNIV., MOSCOW.
Characteristics and Prediction of Soil Erosion on a Watershed in the Palouse,
W75-04033 2J

IDAHO UNIV., MOSCOW. DEPT OF AGRICULTURAL ENGINEERING.
Evaluation of Irrigation Systems in the Snake River Fan, Jefferson County, Idaho,
W75-04032 3F

IDROTECNECO, SAN LORENZO IN CAMPO, (ITALY).
CRE: A Method for Solving Probability Problems Related to Hydrologic Time Series,
W75-04310 2E

ILLINOIS STATE NATURAL HISTORY SURVEY, URBANA.
Comparative Biochemistry, Biodegradability, and Toxicity of DDT and Carbofuran Analogues,
W75-04034 5C

ILLINOIS STATE WATER SURVEY, URBANA.
Cost of Importing Deep Sandstone Water to Eliminate Groundwater Deficits in Northeastern Illinois,
W75-04305 6C

Effect of Turbidity on Algal Growth,
W75-04306 5C

ILLINOIS UNIV. MEDICAL CENTER, CHICAGO, ILL. SCHOOL OF PUBLIC HEALTH.
Biomedical Evaluation of Low Frequency (Long Wave) Electromagnetic Radiation Associated with Electric Power Transmission,
W75-04191 5C

ILLINOIS UNIV., URBANA.
Effect of Moisture Regimes and Green Manuring on Ferrous Iron Concentration in Soil and Growth and Yield of Paddy,
W75-04318 3F

ILLINOIS UNIV., URBANA. AGRICULTURAL EXPERIMENTAL STATION.
Effect of Nitrate and Sediment Constraints on Economically Optimal Clay Production,
W75-04349 4D

ILLINOIS UNIV., URBANA. DEPT. OF CIVIL ENGINEERING.
Model-Prototype Comparisons for Transverse Mixing in Rivers,
W75-03918 8B

Laboratory Studies on Transverse Mixing in Rivers,
W75-03928 8B

ILLINOIS UNIVERITY, CHICAGO. DEPT. OF ENGINEERING.
Toward a Science Policy for Computers in Water Resources: Trends and Issues,
W75-04257 6A

INDIAN AGRICULTURAL RESEARCH INST., NEW DELHI (INDIA).
Effect of Stored Soil Moisture Reserve Through Conservation Practices and Supplemental Irrigation on Wheat Yield Under Dryland Farming Condition,
W75-04346 3F

INDIAN DEFENCE RESEARCH AND DEVELOPMENT ESTABLISHMENT, GWALIOR.
New Spectrophotometric Method for the Estimation of Hexavalent Chromium in Water,
W75-04113 5A

INDIAN GRASSLAND AND FODDER RESEARCH INST., JHANSI.
The Effect of Interval and Intensity of Defoliation on the Dry Matter Production of Some Important Grass Species of Western Rajasthan,
W75-04131 2I

INDIAN INST. OF MANAGEMENT, AHMEDABAD.
Water Utilization and Agricultural Development in Western Uttar Pradesh,
W75-03950 3F

INDIAN INST. OF TECH., KANPUR. DEPT. OF CIVIL ENGINEERING.
A Discrete Linear Model for the Hydrologic Basin,
W75-04242 2A

INDIAN INST. OF TECH., MADRAS, SOIL ENGINEERING LAB.
Mechanistic Response of Expansive Clays,
W75-03955 2G

INDIANA UNIV., BLOOMINGTON.
Solid Waste Disposal by Land Burial in Southern Indiana,
W75-04035 5B

INSTITUTE FOR AGRICULTURAL RESEARCH, ZARIA (NIGERIA).
Comparison of Some Methods for Determining Organic Phosphorus in Some Nigerian Soils,
W75-04139 2G

INSTITUTE FOR APPLIED RESEARCH ON NATURAL RESOURCES, BAGHDAD (IRAQ).
Utilization of Mineral and Thermal Springs in Iraq: Preliminary Report.
W75-04140 4B

INSTITUTE OF GEOLOGICAL SCIENCES, LONDON (ENGLAND). DEPT. OF HYDROGEOLOGY.
Lysimeter Installations in Sandstone at Styrrup, Nottinghamshire,
W75-04332 2G

Groundwater Storage-Riverflow Relations in a Chalk Catchment,
W75-04339 2A

INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.
Control of Reverse Osmosis Membrane Hydrolysis with Dynamically Formed Wood Chemical Membranes,
W75-03890 5D

INSTITUTUL DE STUDII SI CERCETARI HIDROTEHNICE, BUCHAREST (RUMANIA).
Prediction of Oxygen Transfer Rate in Air Bubble Aeration,
W75-04253 5D

IOWA STATE UNIV., AMES.
Effect of Level Terraces on Soil Moisture Content and Utilization by Corn,
W75-04315 3F

IOWA UNIV., IOWA CITY. INST. OF HYDRAULIC RESEARCH.
Reservoir Operation Through Objective Trade-Offs,
W75-04345 4A

JACOBS ENGINEERING CO., PASADENA, CALIF.
Dichromate Relux Chemical Oxygen Demand: A Proposed Method for Chloride Correction in Highly Saline Wastes,
W75-04124 5A

KANSAS AGRICULTURAL EXPERIMENT STATION, MANHATTAN. EVAPOTRANSPIRATION LAB.
Relation of Soybean Leaf Water Potential to Soil Water Potential,
W75-03989 3F

KARLSRUHE UNIV. (WEST GERMANY). THEODOR-REHBOCK LAB. FOR RIVER IMPROVEMENT.
Sensitivity Analysis of the Optimum Design Flood Evaluated by an Optimization Procedure,
W75-04234 4A

KENICS CORP., DANVERS, MASS.
Static Mixing Concept for Aerators Wins Acceptance,
W75-03914 5D

KENTUCKY UNIV., LEXINGTON.
Effect of a Killed Sod Mulch on Nitrate Movement and Corn Yield,
W75-04013 3F

KENTUCKY WATER RESOURCES INST., LEXINGTON.
Stochastic Simulation of Daily Rainfall,
W75-04036 2B

Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky,
W75-04147 2J

KIMBERLY-CLARK CORP., NEENAH, WIS.
Improved Clarification of Book Mill Effluent,
W75-03902 5D

KURITA WATER INDUSTRIES LTD., OSAKA (JAPAN).
On the Application of Polyelectrolytes to White Water Treating by Dissolved-Air Flotation (In Japanese),
W75-03884 5D

L.L.R.M. MEDICAL COLL., MEERUT (INDIA). DEPT. OF HUMAN METABOLISM.
Further Observations on Endemic Fluoride-Induced Osteopathies in Children,
W75-03909 5C

LANDMARK, INC., COLUMBUS, OHIO.
Loess Distribution on a Wisconsin-Age Till Plain in Southwestern Ohio,
W75-04320 2G

LBC AND W CONSULTANTS, COLUMBIA, S.C.
Functional Plan for Water Supply and Waste Water Disposal for the Santee-Wateree Planning District,
W75-04195 5G

LEYLAND URBAN DISTRICT COUNCIL (ENGLAND).
Operational Aspects of Urban Sewage Works,
W75-04114 5D

LIMNETICS, INC., MILWAUKEE, WIS.
Development of a Complete Mathematical Model for Describing the Point Beach Nuclear Power Plant Thermal Plume,
W75-04238 5B

LINDSAY MFG. CO., NEBR. (ASSIGNEE)
Means for Rotatably Supporting an Overhead Irrigation Pipe,
W75-03867 3F

LOS ANGELES COUNTY SANITATION DISTRICTS, WHITTIER, CALIF.
Data Reduction Methods for Hydrologic Analyses,
W75-03929 7C

MAHONING-TRUMBULL COUNCIL OF GOVERNMENTS, OHIO.
A Water Sewer Plan and Program for the Youngstown-Warren Metropolitan Area,
W75-04200 5D

MALCOLM PIRNIE, INC., WHITE PLAINS, N.Y.
Knowlton (Brothers Inc., Watertown, New York) Mill Closes Loop on Waste Treatment/Water Reuse,
W75-03904 5D

MARYLAND ENVIRONMENTAL SERVICE, ANNAPOLIS.
Regional Management of Waste Systems,
W75-04000 5D

MARYLAND UNIV., PRINCE FREDERICK. CENTER FOR ENVIRONMENTAL AND ESTUARINE RESEARCH.
The Thermal Requirements and Tolerances of Key Estuarine Organisms,
W75-03944 5C

MARYLAND UNIV., SOLOMONS. NATURAL RESOURCES INST.
Enhancement of Recreational Uses of Estuarine Waters Through Study of Potential Control Methods for Stinging Sea Nettles,
W75-04037 5C

MASSACHUSETTS UNIV., AMHERST. DEPT. OF CIVIL ENGINEERING.
Wastewater Treatment, Physical and Chemical Methods, (Literature Review),
W75-04121 5D

MASSEY UNIV., PALMERSTON NORTH (NEW ZEALAND). DEPT. OF GEOGRAPHY.
The Unit Hydrograph: A Satisfactory Model of Watershed Response,
W75-04344 2A

MCGILL UNIV., STE. ANNE DE BELLEIRE (QUEBEC).
Acetylene Reduction (Nitrogen Fixation) by Pulp and Paper Mill Effluents and by Klebsiella Isolated from Effluents and Environmental Situations,
W75-03892 5B

MEKOROT WATER CO. (ISRAEL).
Regional Water Supply Development Utilizing Brackish Water Resources in the Southern Arava Region,
W75-03962 3A

MIAMI UNIV., CORAL GABLES, FLA. DEPT. OF CIVIL ENGINEERING.
Natural Phosphate Removal Mechanisms in South Florida Lakes,
W75-04250 5G

MICHIGAN STATE UNIV., EAST LANSING. DEPT. OF FISHERIES AND WILDLIFE.
Prediction of Radioisotope Concentrations in Freshwater Streams,
W75-03852 5B

MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON. DEPT. OF CHEMISTRY AND CHEMICAL ENGINEERING.
Spring and Fall Thermal Bar Development in Lake Superior,
W75-04038 5B

MICHIGAN UNIV., ANN ARBOR. GREAT LAKES RESOURCE MANAGEMENT PROGRAM.
Saginaw Bay: An Evaluation of Existing and Historical Conditions,
W75-04278 5C

MINISTRY OF PUBLIC WORKS, MADRID (SPAIN). SECTION OF SEDIMENTATION AND NATURAL POLLUTION.
Relationship Between Limnological Conditions of Reservoirs and Watershed Features - A Survey,
W75-04244 2H

MINISTRY OF THE PRESIDENCY, MEXICO CITY.
Appraisal of Irrigation Projects and Related Policies and Investments,
W75-03933 3F

MINNESOTA UNIV., MINNEAPOLIS. DEPT. OF CIVIL ENGINEERING AND HYDRAULICS.
A Survey of Organic Carbon Constituents in Natural Fresh Waters,
W75-04252 5B

MINNESOTA UNIV., MINNEAPOLIS. ST. ANTHONY FALLS HYDRAULIC LAB.
Evaluation of Water Temperature Fields Resulting from Heated Water Discharges,
W75-04215 5B

MINNESOTA UNIV., ST. PAUL. DEPT. OF SOIL SCIENCE.
Nitrate and Chloride Accumulation and Distribution in Fertilized Tile-Drained Soils,
W75-04022 5B

MISSISSIPPI UNIV., UNIVERSITY. DEPT. OF GEOLOGY AND GEOLOGICAL ENGINEERING.
Interaction of Bulk Precipitation, Stream Water, and Sewage in a Small Watershed Near Oxford, Mississippi,
W75-04254 5B

MISSOURI UNIV., COLUMBIA.
Lysimetric and Chemical Investigations of Pedological Changes: I. Lysimeters and Their Drainage Waters,
W75-04311 2G

MISSOURI UNIV., COLUMBIA. DEPT. OF CIVIL ENGINEERING.
Characterization and Dewaterability of Water Treatment Plant Residues,
W75-04039 5D

Interactions Between Light and Carbon Dioxide Availabilities as a Control of Algal Species Succession,
W75-04148 5C

MISSOURI UNIV., ROLLA. DEPT. OF CHEMISTRY.
Accumulation of Mercury by Fish and Turtles of the Little Piney River,
W75-04040 5A

MISSOURI UNIV., ROLLA. DEPT. OF CIVIL ENGINEERING.
Pollution Potential of Aquatic Sediments,
W75-04150 5B

MISSOURI UNIV., ROLLA. DEPT. OF ELECTRICAL ENGINEERING.
Use of a Microwave Remote Sensor for Determination of Water in Subsoils,
W75-04149 2G

MITSUBISHI HEAVY-INDUSTRIES LTD., TOKYO (JAPAN).
Application of Micro-Controllers Melmic 100 to Water Treatment Facilities, (In Japanese),
W75-04338 5D

MONTREAL UNIV., (QUEBEC). DEPT. OF BIOLOGICAL SCIENCES.
Preliminary Study of Phytoplankton of Lake St. Louis, A Broadening of the St. Lawrence River near Montreal, Quebec, (In French),
W75-04335 5C

NATIONAL BUREAU OF ECONOMIC RESEARCH, WASHINGTON, D.C.
Changing Water Use in Selected Manufacturing Industries,
W75-03922 6B

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, INC., NEW YORK.
Spill Prevention and Control Aspects of Paper Industry Waste Water Management Programs,
W75-03912 5G

NATIONAL ENERGY AUTHORITY, BANGKOK (THAILAND).
The Approximate Probability Density Function of Range and Adjusted Range,
W75-04246 6A

NATIONAL ENVIRONMENTAL RESEARCH CENTER, CINCINNATI, OHIO. ADVANCED WASTE TREATMENT RESEARCH LAB.
Solid Waste and Water Quality, (Literature Review),
W75-04016 5B

NATIONAL ENVIRONMENTAL RESEARCH CENTER, CORVALLIS, OREG.
A Demonstration of Waste Heat Use in Agriculture,
W75-04224 5D

NATIONAL ENVIRONMENTAL RESEARCH CENTER, LAS VEGAS, NEV.
Decay Scheme Data for Radiation Dose Calculations,
W75-04174 5A

NATIONAL INST. OF AGRICULTURAL ENGINEERING, PENICUIK (SCOTLAND).
A Flotation Method for the Rapid Measurement of the Wet Bulk Density of Soil Clods,
W75-04135 2G

NATIONAL STARCH AND CHEMICAL CORP., NEW YORK.
How to Reduce BOD Levels From Size-Press Starches,
W75-03906 5G

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Deep Snow Measurements Suggested Using Cosmic Radiation,
W75-04331 2C

NAVAL ACADEMY, ANNAPOLIS, MD. DEPT. OF CHEMISTRY.
Hydrogen Peroxide Treatment of Effluent Resulting from Wet Air Oxidation of Shipboard Wastes,
W75-04261 5D

NEBRASKA UNIV., LINCOLN. DEPT. OF AGRONOMY.
A Field Study of the Heat and Drought Tolerance of Grain Sorghum (Sorghum Bicolor

(L.) Moench) as an Approach to Genetic Improvement,
W75-04044 2I

Degradation in Groundwater and Mobility of Herbicides,
W75-04045 5B

NEBRASKA UNIV., LINCOLN. DEPT. OF CIVIL ENGINEERING.
Soil Adsorption of Humic Color,
W75-04043 5D

NEBRASKA UNIV., LINCOLN. WATER RESOURCES RESEARCH INST.
Elkhorn River Basin Screening Model, A Report to the Missouri River Basin Commission,
W75-03921 6A

NEVADA AGRICULTURAL EXPERIMENT STATION, RENO.
Evaluation of EDDHA as an Extraction and Analytical Reagent for Assessing the Iron Status of Soils,
W75-04144 2G

NEVADA UNIV., RENO. DESERT RESEARCH INST.
Irreversible Thermodynamic Concept on Hydrogeochemical Transport Systems,
W75-04041 5B

Application of Analog Techniques to Water Management,
W75-04202 6A

Project Skywater.
W75-04265 3B

NEW MEXICO STATE UNIV., UNIVERSITY PARK. DEPT. OF AGRICULTURAL ECONOMICS.
Water Resources Evaluation of the Southern High Plains of New Mexico,
W75-04042 4B

NEW SOUTH WALES INST. OF TECHNOLOGY, KENSINGTON (AUSTRALIA). DEPT. OF ECONOMICS.
The Measurement of Impacts in Small Watersheds for Flood Control,
W75-04341 4A

NEW SOUTH WALES UNIV., KENSINGTON (AUSTRALIA).
Chance-Constrained Dynamic Programing and the Optimization of Water Resource Systems,
W75-03934 4A

NEW YORK STATE DEPT. OF HEALTH, ALBANY. RADIOLOGICAL SCIENCES LAB.
C-14 Gaseous Effluent From Pressurized Water Reactors,
W75-04171 5A

NEW YORK UNIV., N.Y. DEPT. OF BIOLOGY.
Toxicity of Zinc and Cygon, Applied Singly and Jointly, to Zebrafish Embryos,
W75-04282 5C

Effects of Natural Microbial Preparations on the Electrokinetic Potential of Bacterial Cells and Clay Minerals,
W75-04317 5B

NORTH CAROLINA STATE UNIV., RALEIGH.
Influence of Tobacco Plant Canopy on Percolation,
W75-03931 3F

NORTH CAROLINA STATE UNIV., RALEIGH. COLEANDER NATIONAL RICE PROGRAM PERU.
Performance of Sulfurcoated Urea Under Intermittently Flooded Rice Culture in Peru,
W75-04313 3F

NORTH CAROLINA STATE UNIV., RALEIGH. DEPT. OF AGRICULTURAL ENGINEERING.
Design of a Conduit System with Diverging Branches,
W75-03930 8A

NORTH CAROLINA STATE UNIV., RALEIGH. DEPT. OF ECONOMICS.
Economic Analysis of Land Treatment of Municipal Wastewaters,
W75-04047 5D

NORTH CAROLINA STATE UNIV., RALEIGH. DEPT. OF ENTOMOLOGY.
Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations,
W75-04048 5G

NORTH CAROLINA STATE UNIV., RALEIGH. SEA GRANT PROGRAM.
Legal Considerations of Egyptian Restriction of Free Passage in the Straits of Tiran and the Gulf of Aqaba,
W75-04002 6E

NORTH CAROLINA UNIV., CHAPEL HILL.
Planned Reuse of Polluted Waters and Wastewaters,
W75-04198 5D

NORTH CAROLINA UNIV., CHAPEL HILL. DEPT. OF ENVIRONMENTAL SCIENCES AND ENGINEERING.
Long Term Trends in Water Quality, Lower Haw and New Hope Rivers - 1966-1973,
W75-04046 5B

NORTH DAKOTA STATE UNIV., FARGO. DEPT. OF MECHANICAL ENGINEERING.
Dry-Type Cooling Systems in Electric Power Production,
W75-04221 5D

NORTHEASTERN ILLINOIS UNIVERSITY, CHICAGO, ILLINOIS.
A Model Study for the Projected Increase in Water Use in Kane County, Illinois, U.S.A.,
W75-04258 6B

NORTHWESTERN UNIV., EVANSTON, ILL. TECHNOLOGICAL INST.
Disposal of Polluted Dredgings from the Great Lakes Area,
W75-04251 5B

NOTRE DAME UNIV., IND. DEPT. OF CHEMICAL ENGINEERING.
Mixing in Anaerobic Digestion,
W75-04120 5D

NUS CORP., ROCKVILLE, MD.
Entrainment of Stratospheric Tritium: Another Radiological Anomaly of the Rocky Mountain West,
W75-04162 5A

OAK RIDGE NATIONAL LAB., TENN.
The Effect of Various Rates of Semicontinuous Drip Irrigation on Lettuce, (Lactuca Sativa L.) Grown in Greenhouse,
W75-04146 2I

Environmental Radiation Measurements Using in Situ and Core Sampling Techniques,
W75-04159 5A

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities. Part I: Population Doses from Operating Facilities,
W75-04166 5B

Population Exposure Estimates as Derived from an Environmental Assessment of LWR Fuel Cycle Facilities, Part II: Long-Term Population Doses Following Cessation of Plant Operations,
W75-04167 5B

Projections of Radioactive Wastes from the Nuclear Fuel Cycle,
W75-04169 5B

Effect of Stack Height on Individual and Population Doses Attributable to Gaseous Effluents from a Model Fuel Reprocessing Facility,
W75-04170 5A

Dosimetry of Internal Emitters for Population Exposure,
W75-04172 5C

Measurement of Absorbed Fractions For Photon Sources Distributed Uniformly in Various Organs of a Heterogeneous Phantom,
W75-04173 5A

A Metabolic Model for Whole Body and GI Tract Retention in a Human Infant Deduced from Experimental Data on Suckling Rats Administered a Single Oral Dose of Cerium-141 at Different Ages,
W75-04175 5C

Age Factors for Dose Rates From an Infinite Cloud of a Photon Emitter,
W75-04176 5C

The Effect of Deposition Velocities on Estimates of Environmental Transport and Population Doses,
W75-04177 5A

Field Testing of TSEE Dosimeters for Personnel Monitoring,
W75-04179 5A

Condos-A Model and Computer Code to Estimate Population and Individual Radiation Doses to Man From the Distribution, Use and Disposal of Consumer Products That Contain Radioactive Materials,
W75-04182 5B

Large Scale Nuclear Gas Stimulation: Population Doses Estimated in the Environmental Assessment of Carbon-14 Releases,
W75-04186 5A

Philosophy and Methodology of Assessment of Radiation Doses to Populations from Combustion Products of Plowshare Natural Gas,
W75-04187 5C

Irradiated Fuel and Control Rods Transport from a Decommissioned Power Reactor,
W75-04188 5E

OCCIDENTAL PETROLEUM CORP., LOS ANGELES, CALIF. (ASSIGNEE).
Hot Ball Desalination Process,
W75-03878 3A

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, WASHINGTON, D.C.
Exposures to Five Target Health Hazards,
W75-04190 5A

OFFICE OF RADIATION PROGRAMS, SILVER SPRING, MD. ELECTROMAGANETIC RADIATION ANALYSIS BRANCH.
The Use of an Automated Population Data Base in Population Exposure Calculations,
W75-04157 5A

OFFICE OF RADIATION PROGRAMS, WASHINGTON, D.C.
The Historical Development of Concepts of Radiation Dose Commitment,
W75-04153 5C

Trends in Population Radiation Exposure from Operating BWR Gaseous Effluents,
W75-04165 5B

Comparative Population Radiation Dose Commitments of Nuclear and Fossil Fuel Electric Power Cycles,
W75-04181 5C

OHIO RIVER BASIN COMMISSION, CINCINNATI.
A Set of Regime Equations For Indirectly Estimating Stream Flow Characteristics,
W75-04245 2E

OKLAHOMA UNIV., NORMAN. DEPT. OF AEROSPACE, MECHANICAL AND NUCLEAR ENGINEERING.
Design of Thermal Cooling Systems Using the Cascade of Energy Concept,
W75-04228 5D

ONTARIO MINISTRY OF NATURAL RESOURCES, THUNDER BAY. FISH AND WILDLIFE RESEARCH BRANCH.
The Morphoedaphic Index, A Fish Yield Estimator--Review and Evaluation,
W75-04116 5C

ONTARIO MINISTRY OF THE ENVIRONMENT, TORONTO.
Effect of Soil Temperature on Direction of Corn Root Growth,
W75-03954 3F

OREGON STATE UNIV., CORVALLIS.
The Biochemical Oxygen Demand of Finely Divided Logging Debris in Stream Water,
W75-03913 5C

OREGON STATE UNIV., CORVALLIS. OCEAN ENGINEERING PROGRAMS.
Ambient Current Effects on Vertical Selective Withdrawal in a Two Layer System,
W75-04049 4A

OXFORD UNIV. (ENGLAND). DEPT. OF AGRICULTURAL SCIENCE.
Effects of CCC on Drought Resistance of Triticum Aestivum L and Zea Mays L,
W75-04011 3F

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LAB., CORVALLIS, OREG.
Some Results from Experimental Data on Surface Jet Discharge of Heated Water,
W75-04220 5B

PATENTS AND DEVELOPMENTS A/S, NESTTUN (NORWAY). (ASSIGNEE)
Pumping Apparatus for Skimming and Recovering an Oil Layer from a Body of Water,
W75-03865 5G

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Microbiology of Waste Treatment, (Literature Review),
W75-04117 5D

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. DEPT. OF CIVIL ENGINEERING.
The Triangle as a Tentative Unit Hydrograph,
W75-04239 4A

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. DEPT. OF ECONOMICS.
Criteria for Regionalization of Water and Waste Management Systems,
W75-03946 5D

PENNSYLVANIA UNIV. PHILADELPHIA. INST. FOR ENVIRONMENTAL STUDIES.
The Next Ten Years: Some Recommendations to the Delaware River Basin Commission,
W75-04210 6B

PENNSYLVANIA UNIV., PHILADELPHIA. INST. OF ENVIRONMENTAL STUDIES.
Conservation and Flooding Easements: A Case Study,
W75-04211 6E

PETTIGREW ENGINEERING CO. PTY. LTD. (AUSTRALIA).
Quality Water for Human Consumption and Industry,
W75-03941 5D

PHILADELPHIA WATER DEPT., PA.
Philadelphia Pilots--Builds Oxygen Activated Sludge,
W75-04115 5D

PIECZONKA CONSULTANTS, LACKAWANNA, N.Y.
Phosphorus Detergent Ban-How Effective,
W75-04109 5D

PONTIFICIA UNIVERSIDADE CATOLICA DO RIO DE JANEIRO (BRAZIL); AND UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (BRAZIL).
Temporary Body Burdens in Dose-Effect Studies of the Brazilian Areas of High Natural Radioactivity,
W75-04161 5C

PUERTO RICO NUCLEAR CENTER, RIO PIEDRAS.
Population Exposure to Natural Radiation Background in Puerto Rico,
W75-04160 5B

PURDUE UNIV., LAFAYETTE, IND.
Stochastic Models for the Interaction of Rainfall and Groundwater Levels,
W75-03949 2A

QUEENSLAND UNIV., BRISBANE (AUSTRALIA). DEPT. OF BOTANY.
Effects of Low Water Potentials on Transpiration and Photosynthesis in Mitchell Grass (Astrebla Lappacea),
W75-03938 2D

REACTOR CENTRUM NEDERLAND, PETTEN.
The Determination of Mercury in Water Samples from the Environment by Neutron Activation Analysis,
W75-03908 5A

RESEARCH INST. OF LABOR PROTECTION AND OCCUPATIONAL DISEASES, SOFIA (BULGARIA).
An Experimental Basis for Maximal Permissible Concentrations of Patoran in Surface Waters, (In Russian),
W75-03959 5C

RIVERS HOUSE, GLASGOW, (SCOTLAND).
Water Pollution and Control,
W75-03915 5B

ROTHAMSTED EXPERIMENTAL STATION, HARPENDEN (ENGLAND). DEPT. OF CHEMISTRY.
Cropping Patterns Involving Rice and Their Management,
W75-04127 3F

SANITARNO-GIGIENICHESKII MEDITSINSKII INSTITUT, LENINGRAD (USSR).
Experimental Data for Hygienic Standardization of Dihydroperoxide Meta-Diisopropylbenze in Surface Waters, (In Russian),
W75-04319 5C

SAPPORO MEDICAL COLL. (JAPAN). DEPT. OF PUBLIC HEALTH.
Effects of Phthalate Esters on Shrimp,
W75-04285 5C

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
The Comparative Marine Geochemistries of Lead 210 and Radium 226,
W75-04029 5B

SECRETARIAT FOR INTERNATIONAL ECOLOGY (SWEDEN).
A Review of Desertization in Africa--Water, Vegetation, and Man,
W75-04142 2J

SENATE, WASHINGTON, D.C.
The Philosophy of S.2770,
W75-04001 5G

SIR GEORGE WILLIAMS UNIV., MONTREAL (QUEBEC).
Some Characteristics of Counterjet Flow,
W75-04217 5B

SOAP AND DETERGENT ASSOCIATION, NEW YORK.
WPCF Adopts Resolutions Aimed at Easing Problems of Water Law.
W75-04009 5G

SOCIETE POUR L'EQUIPMENT DES INDUSTRIES CHIMIQUES, PARIS (FRANCE). (ASSIGNEE)
Process and Device for Purification of Effluents Containing Phenols and Ammonium Salts,
W75-03859 5D

SOIL CONSERVATION SERVICE, PALMER, ALASKA.
Temperature Regimes and Classification of Some Well-Drained Alpine Soils in Alaska,
W75-04314 2G

SOLEM MACHINE CO., ROCKFORD, ILL. (ASSIGNEE).
Liquid Aerating Apparatus,
W75-03875 5D

SOUTH CAROLINA UNIV., COLUMBIA. DEPT. OF GEOLOGY.
The Dilution Capacity of Small Streams in South Carolina,
W75-04050 5B

SOUTHERN CALIFORNIA, UNIVERSITY OF LOS ANGELES. SEA GRANT PROGRAM.
Marine Studies of San Pedro Bay, California, Part V; Data Report, Temperature, Salinity, Oxygen and Hydrogen Ion Concentration in outer Los Angeles Harbor, June 1971 to November 1973.
W75-04272 5B

STANFORD UNIV., CALIF.
Enhancing Water Resource Planning Effectiveness: A Simulation Gaming Approach,
W75-04233 6A

STATE UNIV. COLL., BUFFALO. GREAT LAKES LAB.
Rejuvenation of the Buffalo River,
W75-04248 5C

STATE UNIV. OF NEW YORK, BUFFALO. DEPT. OF BIOCHEMISTRY.
The Effect of Cadmium on Population Growth in the Green Alga Scenedesmus Quadracauda,
W75-04284 5C

STAZIONE SPERIMENTALE PER LA CELLULOSA, CARTA E FIBRE TESSILI VEGETALI ED ARTIFICIALI, MILANO (ITALY).
Control Methods for Waste Waters and Solutions of Specific Substances (Metodi di controllo di acque di scarico e soluzioni di sostanze specifiche),
W75-03885 5B

STONE AND WEBSTER ENGINEERING CORP., BOSTON, MASS. ENVIRONMENTAL ENGINEERING DIV.
Two-Dimensional Transient Hydro-Thermal Mathematical Model,
W75-04219 2H

SUDESCO SYSTEMS, INC., BUFFALO, N.Y.
Design and Model Tests of Thermal Discharge Diffusers,
W75-04216 8B

SULZER BROS. LTD., WINTERHUR (SWITZERLAND). (ASSIGNEE)
Plant for Treating Water, in Particular Sewage or Sludge,
W75-03862 5D

SWECO, INC., LOS ANGELES, CALIF. ENVIRONMENTAL SYSTEMS DIV.
New Screening Concept Boosts Water Reuse at Boxboard Mill,
W75-03900 5D

TAHAL CONSULTING ENGINEERS LTD., TEL AVIV (ISRAEL). DEPT. OF RESEARCH, DEVELOPMENT AND PLANNING.
A Method for Maintaining Cross and Serial Correlations and the Coefficient of Skewness Under Generation in a Linear Bivariate Regression Model,
W75-04309 2E

TECHNION - ISRAEL INST. OF TECH., HAIFA (ISRAEL). DEPT. OF CIVIL ENGINEERING.
The Shape of the Interface in Steady Flow in a Stratified Aquifer,
W75-04329 2F

TECHNISCHE UNIVERSITAET, MUNICH (WEST GERMANY). PHYSIKDEPARTMENT.
Detection of Water Pollutants by a CO2 Laser,
W75-04012 5A

TENNESSEE VALLEY AUTHORITY, KNOXVILLE, TENN. HYDROLOGIC RESEARCH AND ANALYSIS OFFICE.
A Double-Triangle Model for Generating Storm Hydrographs,
W75-04241 4A

TEXAS A AND M RESEARCH FOUNDATION, COLLEGE STATION.
Hydrodynamic Effects of Oil Slick Mechanical Control Devices,
W75-04327 5G

TEXAS A AND M UNIV., EL PASO. AGRICULTURAL RESEARCH STATION.
The Influence of Soil Salinity Upon Fruiting and Shedding, Boll Characteristics, Fiber Quality, and Yields of Two Cotton Species,
W75-04134 3C

TEXAS UNIV., HOUSTON. SCHOOL OF PUBLIC HEALTH.
Estimation of the Dose Equivalent to the U.S. Population from Radon in Liquified Petroleum Gas,
W75-04184 5A

TOWSON STATE COLL., BALTIMORE, MD. DEPT. OF COMPUTER SCIENCE.
Cooling Pond Temperature Prediction,
W75-04222 5B

TRENT RIVER AUTHORITY (ENGLAND). POLLUTION CONTROL AND FISHERIES DEPT.
The Toxicities of Sewage Effluents, Industrial Discharges and Some Chemical Substances to Brown Trout (Salmo Trutta) in the Trent River Authority Area,
W75-04110 5C

UARIZONA UNIV., TUCSON DEPT. OF SOILS, WATER AND ENGINEERING.
Effect of Sulfuric Acid and Sulfur Dioxide on the Aggregate Stability of Calcareous Soils,
W75-03952 2G

UDAIPUR UNIV. (INDIA). COLL. OF AGRICULTURE.
Effect of Quality of Irrigation Water on Dry Matter Production, and on Calcium, Magnesium and Phosphorus Content of Wheat, Barley and Pea,
W75-04137 2I

ULTRASCIENCE, INC., SKOKIE IH. (ASSIGNEE).
Method and Apparatus for Use in Water Purification by Reverse Osmosis,
W75-03874 5D

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy,
W75-04007 6E

UTAH STATE UNIV., LOGAN. DEPT. OF ECONOMICS.
Pricing Irrigation Water in Iran,
W75-03936 3F

The Development of Supplemental Water: Resource Flexibility and Farm Management Options,
W75-04031 3F

UTAH STATE UNIV., LOGAN. DEPT. OF SOIL BIOCHEMISTRY AND MICROBIOLOGY.
Nitrogen Fixation By Blue-Green Algae-Lichen Crusts in the Great Basin Desert,
W75-03963 5B

UTAH WATER RESEARCH LAB., LOGAN.
Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges-A Compilation of the Literature,
W75-03854 5C

Planning for Water Quality in the Virgin River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04206 5G

Planning for Water Quality in the Sevier River System in the State of Utah: A Program for Developing a Comprehensive Water Quality Management Plan.
W75-04207 5G

UTAH WATER RESEARCH LAB., LOGAN.; AND UTAH STATE UNIV., LOGAN. DIV. OF ENVIRONMENTAL ENGINEERING.
A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae,
W75-04052 5C

UTTAR PRADESH AGRICULTURAL UNIV., PANTNAGAR (INDIA).
Influence of Irrigation Water Quality on Exchangeable Sodium Percentage in a Sodic Soil,
W75-04136 2G

UTTAR PRADESH IRRIGATION DEPT., LOCKNOW (INDIA).
A Gamma Transmission Method for the Determination of Moisture Content in Soils,
W75-04343 2G

VANDERBILT UNIV., NASHVILLE, TENN. DEPT. OF ENVIRONMENTAL AND WATER RESOURCES ENGINEERING.
Cooling Towers - Best Achievable Thermal Pollution Abatement Technology,
W75-04223 5D

Review of Heated Surface Discharge Models Applicable to Rivers,
W75-04229 5B

VSESOYUZNYI NAUCHNYI-ISSLEDOVATELSKII INSTITUT BUMAGI, ARKHANGELSK (USSR).
Ultraviolet Spectrophotometric Method for the Determination of Lignin in Effluents (UF-spektrofotometricheskii metod opredeleniya lignina v stocknykh vodakh),
W75-03897 5A

VSESOYUZNYI-NAUCHNYI PLANOVII OTDEL'BUMAZHNOI PROMYSHLENNOST, MOSCOW (USSR).
Selection of Coagulants for Treatment of Excess Activated Sludge (Vybor koagulyantov dlya obrabotki izbytochnogo aktivnogo ila),
W75-03894 5D

VYSKUMNY USTAV PAPIER A CELULOZY, BRATISLAVA (CZECHOSLOVAKIA).
Use and Disposal of Solid Wastes From Pulp and Paper Production (Vyuzitie a likvidacia pevnych odpadov z vyroby buniciny a papiera),
W75-03886 5D

WASHINGTON STATE UNIV., PULLMAN. R. L. ALBROOK HYDRAULIC LAB.
More Responsive Water Planning is Possible,
W75-04203 6A

WATER ECONOMICS RESEARCH INST., WARSAW (POLAND). DEPT. OF WATER CHEMISTRY AND BIOLOGY.
Thermal Pollution Problems in Poland,
W75-04218 5C

WATER POLLUTION RESEARCH LAB., STEVENAGE (ENGLAND).
An Automated Method for the Determination of Formaldehyde in Sewage and Sewage Effluents,
W75-04112 5A

WATER POLLUTION RESEARCH LAB., STEVENAGE (ENGLAND).

Treatment of Crude Sewage in Two High-Rate Activated-Sludge Plants Operated in Series,
W75-04334 5D

WATERLOO UNIV. (ONTARIO). DEPT. OF BIOLOGY.

Benthos and Allochthonous Organic Matter in Streams,
W75-04119 5B

WATERLOOPKUNDIG LABORATORIUM, DELFT (NETHERLANDS).

Digging in of Anchors into the Bottom of the North Sea,
W75-03919 8B

Some Hydrodynamical Aspects of Gravity-Type Platform Design,
W75-03924 8B

Stopping Distances of V.L.C.C. in IJmuiden,
W75-03925 8B

WATERLOOPKUNDIG LABORATORIUM, DELFT (NETHERLANDS). DENSITY CURRENTS BRANCH.

Pneumatic Barriers to Reduce Salt Intrusion Through Locks,
W75-03920 8A

WATERLOOPKUNDIG LABORATORIUM, DELFT (NETHERLANDS). MATHEMATICS BRANCH.

Transverse Mixing in Rivers; A Numerical Approach,
W75-03917 8B

Linear Wave Propagation Problems and the Finite Element Method,
W75-03926 8B

WATSON (J. D. AND D. M.), LONDON (ENGLAND).

Investigation for the Marine Disposal of Effluents,
W75-04289 5B

WEIZMANN INST. OF SCIENCE, REHOVOT (ISRAEL) DEPT. OF ISOTOPE RESEARCH.

Physical Properties of Oxygen-17 Water: Absolute Viscosity and Density of H2(17)0 Between 15 and 35C,
W75-03881 1A

WELSBACH OZONE SYSTEMS CORP., PHILADELPHIA, PA.

Ozone: A New Method to Remove Color in Secondary Effluents,
W75-03903 5D

WEST VIRGINIA UNIV., MORGANTOWN. WATER RESEARCH INST.

Objective Double-Mass Analysis,
W75-04307 2B

WISCONSIN UNIV., MADISON. SCHOOL OF LAW.

The Emerging Right of Physical Enforcement of Fisheries Measures Beyond Territorial Limits,
W75-03995 6E

WISCONSIN UNIV., MADISON. WATER CHEMISTRY PROGRAM; AND WISCONSIN UNIV., MADISON. DEPT. OF SOIL SCIENCE.

Biological Availability of Sediment Phosphorus to Macrophytes,
W75-04053 5B

WISCONSIN UNIV., MILWAUKEE. DEPT. OF ENERGETICS.

Analytical Model for a Heated Submerged Discharge into Break Water Wall Area,
W75-04214 2H

WYOMING UNI., LARAMIE.

The Model Water Code, the Wise Administrator and the Goddam Bureaucrat,
W75-04199 6E

WYOMING UNIV., LARAMIE. DEPT. OF BOTANY.

The Effect of Salinity on a Marine and a Freshwater Ascomycete,
W75-04267 5C

YALE UNIV., NEW HAVEN, CONN. DEPT. OF BIOLOGY.

Some Biological Aspects of Aquatic Thermal Discharges,
W75-04225 5C

ACCESSION NUMBER INDEX

W75-03851 5G
W75-03852 5B
W75-03853 4B
W75-03854 5C
W75-03855 4A
W75-03856 6B
W75-03857 5D
W75-03858 5D
W75-03859 5D
W75-03860 3A
W75-03861 5A
W75-03862 5D
W75-03863 4A
W75-03864 5D
W75-03865 5G
W75-03866 5D
W75-03867 3F
W75-03868 8B
W75-03869 5G
W75-03870 5G
W75-03871 8B
W75-03872 5G
W75-03873 8A
W75-03874 5D
W75-03875 5D
W75-03876 3A
W75-03877 3F
W75-03878 3A
W75-03879 5D
W75-03880 5D
W75-03881 1A
W75-03882 5D
W75-03883 5D
W75-03884 5D
W75-03885 5B
W75-03886 5D
W75-03887 5D
W75-03888 5D
W75-03889 5D
W75-03890 5D
W75-03891 5D
W75-03892 5B
W75-03893 5D
W75-03894 5D
W75-03895 5D
W75-03896 5D
W75-03897 5A
W75-03898 5D
W75-03899 5D
W75-03900 5D
W75-03901 5G
W75-03902 5D
W75-03903 5D
W75-03904 5D
W75-03905 5D
W75-03906 5G
W75-03907 5D
W75-03908 5A
W75-03909 5C
W75-03910 5A
W75-03911 5A
W75-03912 5G
W75-03913 5C
W75-03914 5D
W75-03915 5B
W75-03916 5D
W75-03917 8B
W75-03918 8B
W75-03919 8B
W75-03920 8A
W75-03921 6A
W75-03922 6B
W75-03923 4A
W75-03924 8B
W75-03925 8B
W75-03926 8B
W75-03927 8B
W75-03928 8B
W75-03929 7C
W75-03930 8A
W75-03931 3F
W75-03932 4A
W75-03933 3F
W75-03934 4A
W75-03935 4A
W75-03936 3F
W75-03937 2D
W75-03938 2D
W75-03939 5A
W75-03940 2G
W75-03941 5D
W75-03942 5D
W75-03943 5F
W75-03944 5C
W75-03945 5B
W75-03946 5D
W75-03947 4D
W75-03948 4D
W75-03949 2A
W75-03950 3F
W75-03951 3F
W75-03952 2G
W75-03953 2G
W75-03954 3F
W75-03955 2G
W75-03956 2I
W75-03957 4A
W75-03958 3F
W75-03959 5C
W75-03960 3F
W75-03961 3B
W75-03962 3A
W75-03963 5B
W75-03964 2I
W75-03965 2D
W75-03966 8F
W75-03967 4A
W75-03968 2H
W75-03969 7C
W75-03970 7C
W75-03971 7C
W75-03972 4B
W75-03973 7C
W75-03974 5B
W75-03975 2H
W75-03976 3B
W75-03977 7C
W75-03978 7C
W75-03979 2K
W75-03980 2K
W75-03981 2H
W75-03982 2H
W75-03983 6D
W75-03984 2F
W75-03985 3E
W75-03986 2F
W75-03987 2F
W75-03988 5B
W75-03989 3F
W75-03990 4A
W75-03991 3F
W75-03992 5G
W75-03993 6E
W75-03994 6E
W75-03995 6E
W75-03996 6E
W75-03997 6E
W75-03998 5G
W75-03999 5G
W75-04000 5D
W75-04001 5G
W75-04002 6E
W75-04003 6E
W75-04004 6E
W75-04005 6E
W75-04006 6E
W75-04007 6E
W75-04008 6E
W75-04009 5G
W75-04010 6G
W75-04011 3F
W75-04012 5A
W75-04013 3F
W75-04014 5G
W75-04015 5D
W75-04016 5B
W75-04017 5G
W75-04018 5G
W75-04019 5F
W75-04020 5G
W75-04021 5A
W75-04022 5B
W75-04023 5G
W75-04024 5G
W75-04025 6B
W75-04026 4A
W75-04027 5B
W75-04028 5C
W75-04029 5B
W75-04030 3F
W75-04031 3F
W75-04032 3F
W75-04033 2J
W75-04034 5C
W75-04035 5B
W75-04036 2B
W75-04037 5C
W75-04038 5B
W75-04039 5D
W75-04040 5A
W75-04041 5B
W75-04042 4B
W75-04043 5D
W75-04044 2I
W75-04045 5B
W75-04046 5B
W75-04047 5D
W75-04048 5G
W75-04049 4A
W75-04050 5B
W75-04051 4C
W75-04052 5C
W75-04053 5B
W75-04054 5B
W75-04055 5B
W75-04056 5B
W75-04057 5A
W75-04058 5A
W75-04059 2B
W75-04060 2B
W75-04061 5A
W75-04062 5B
W75-04063 5B
W75-04064 5B
W75-04065 5B
W75-04066 5B
W75-04067 5B
W75-04068 5B
W75-04069 5B
W75-04070 5B
W75-04071 5B
W75-04072 5B
W75-04073 2B
W75-04074 5B
W75-04075 5B
W75-04076 5B
W75-04077 5B
W75-04078 5A
W75-04079 5B
W75-04080 5A
W75-04081 5B
W75-04082 5B
W75-04083 5A
W75-04084 5A
W75-04085 5A
W75-04086 5A
W75-04087 5A
W75-04088 5A
W75-04089 5A
W75-04090 5B
W75-04091 5A
W75-04092 5A
W75-04093 5A
W75-04094 5A
W75-04095 5A
W75-04096 5A
W75-04097 5A
W75-04098 5A
W75-04099 5A
W75-04100 5A
W75-04101 5A
W75-04102 5A
W75-04103 5B
W75-04104 5B
W75-04105 5A
W75-04106 5B
W75-04107 5A
W75-04108 5A
W75-04109 5D
W75-04110 5C
W75-04111 3F
W75-04112 5A
W75-04113 5A
W75-04114 5D
W75-04115 5D
W75-04116 5C
W75-04117 5D
W75-04118 5G
W75-04119 5B
W75-04120 5D
W75-04121 5D
W75-04122 5D
W75-04123 5D
W75-04124 5A
W75-04125 2E
W75-04126 2I
W75-04127 3F
W75-04128 3A
W75-04129 3F
W75-04130 2A
W75-04131 2I
W75-04132 2G
W75-04133 3F
W75-04134 3C
W75-04135 2G
W75-04136 2G
W75-04137 2I
W75-04138 3F
W75-04139 2G
W75-04140 4B
W75-04141 2G
W75-04142 2J
W75-04143 6E
W75-04144 2G
W75-04145 2F
W75-04146 2I
W75-04147 2J
W75-04148 5C
W75-04149 2G
W75-04150 5B
W75-04151 6B
W75-04152 5C
W75-04153 5C
W75-04154 5C
W75-04155 5G
W75-04156 5A
W75-04157 5A
W75-04158 5A
W75-04159 5A
W75-04160 5B
W75-04161 5C
W75-04162 5A

W75-04163 5A
W75-04164 5B
W75-04165 5B
W75-04166 5B
W75-04167 5B
W75-04168 5A
W75-04169 5B
W75-04170 5A
W75-04171 5A
W75-04172 5C
W75-04173 5A
W75-04174 5A
W75-04175 5C
W75-04176 5C
W75-04177 5A
W75-04178 5A
W75-04179 5A
W75-04180 5C
W75-04181 5C
W75-04182 5B
W75-04183 5C
W75-04184 5A
W75-04185 5A
W75-04186 5A
W75-04187 5C
W75-04188 5E
W75-04189 5C
W75-04190 5A
W75-04191 5C
W75-04192 5A
W75-04193 5A
W75-04194 5A
W75-04195 5G
W75-04196 5G
W75-04197 6C
W75-04198 5D
W75-04199 6E
W75-04200 5D
W75-04201 6C
W75-04202 6A
W75-04203 6A
W75-04204 4A
W75-04205 4A
W75-04206 5G
W75-04207 5G
W75-04208 2E
W75-04209 2E
W75-04210 6B
W75-04211 6E
W75-04212 4A
W75-04213 5B
W75-04214 2H
W75-04215 5B
W75-04216 8B
W75-04217 5B
W75-04218 5C
W75-04219 2H
W75-04220 5B
W75-04221 5D
W75-04222 5B
W75-04223 5D
W75-04224 5D
W75-04225 5C
W75-04226 5B
W75-04227 5D
W75-04228 5D
W75-04229 5B
W75-04230 5B
W75-04231 5B
W75-04232 6A
W75-04233 6A
W75-04234 4A
W75-04235 5B
W75-04236 5A
W75-04237 5B
W75-04238 5E
W75-04239 4A
W75-04240 2A
W75-04241 4A
W75-04242 2A
W75-04243 4A
W75-04244 2H
W75-04245 2E
W75-04246 6A
W75-04247 5G
W75-04248 5C
W75-04249 6B
W75-04250 5G
W75-04251 5B
W75-04252 5B
W75-04253 5D
W75-04254 5B
W75-04255 3B
W75-04256 5B
W75-04257 6A
W75-04258 6B
W75-04259 5A
W75-04260 5B
W75-04261 5D
W75-04262 5B
W75-04263 5D
W75-04264 5C
W75-04265 3B
W75-04266 5G
W75-04267 5C
W75-04268 5E
W75-04269 8B
W75-04270 8B
W75-04271 2F
W75-04272 5B
W75-04273 2D
W75-04274 6G
W75-04275 2L
W75-04276 5B
W75-04277 2E
W75-04278 5C
W75-04279 2L
W75-04280 2F
W75-04281 5C
W75-04282 5C
W75-04283 5C
W75-04284 5C
W75-04285 5C
W75-04286 5C
W75-04287 5C
W75-04288 3F
W75-04289 5B
W75-04290 6E
W75-04291 6E
W75-04292 6E
W75-04293 6E
W75-04294 6E
W75-04295 6E
W75-04296 6E
W75-04297 6E
W75-04298 6E
W75-04299 6E
W75-04300 6E
W75-04301 5G
W75-04302 5G
W75-04303 5G
W75-04304 6E
W75-04305 6C
W75-04306 5C
W75-04307 2B
W75-04308 2F
W75-04309 2E
W75-04310 2E
W75-04311 2G
W75-04312 2G
W75-04313 3F
W75-04314 2G
W75-04315 3F
W75-04316 3F
W75-04317 5B
W75-04318 3F
W75-04319 5C
W75-04320 2G
W75-04321 3F
W75-04322 5G
W75-04323 5G
W75-04324 5G
W75-04325 5D
W75-04326 5G
W75-04327 5G
W75-04328 6F
W75-04329 2F
W75-04330 2B
W75-04331 2C
W75-04332 2G
W75-04333 2F
W75-04334 5D
W75-04335 5C
W75-04336 5D
W75-04337 5D
W75-04338 5D
W75-04339 2A
W75-04340 2F
W75-04341 4A
W75-04342 4C
W75-04343 2G
W75-04344 2A
W75-04345 4A
W75-04346 3F
W75-04347 5B
W75-04348 5B
W75-04349 4D
W75-04350 5B

ABSTRACT SOURCES

Source	Accession Number	Total
A. Centers of Competence		
AEC Oak Ridge National Laboratory, Nuclear Radiation and Safety	W75-04054 -- 04108 04152 -- 04194	98
Cornell University, Policy Models for Water Resources Systems	W75-03917 -- 03930 03932 -- 03936	19
Franklin Institute (FIRL), Municipal Wastewater Treatment Technology	W75-04012 04014 -- 04029 04109 -- 04110 04112 -- 04124 04289 04322 -- 04326 04334 04336 -- 04338 04349	43
Illinois State Water Survey, Hydrology	W75-04213 -- 04263 04265 -- 04266 04268 -- 04280 04305 -- 04310 04327 04329 -- 04333 04339 -- 04345 04350	86
Institute of Paper Chemistry, Water Pollution from Pulp and Paper Industry	W75-03880 -- 03908 03910 -- 03916	36
University of Arizona, Arid Land Water Resources	W75-03950 -- 03953 03955 -- 03958 03960 -- 03966 03989 -- 03990 04125 -- 04126 04128 -- 04134 04136 -- 04146	37
University of Florida, Eastern U. S. Water Law	W75-03992 -- 04010 04290 -- 04304	34
University of North Carolina, Metropolitan Water Resources Planning and Management	W75-04195 -- 04212 04328	19
B. State Water Resources Research Institutes		
Arizona Water Resources Research Center	W75-03851	1
Idaho Water Resources Research Institute	W75-04032 -- 04033	2
Illinois Water Resources Center	W75-04034	1
Indiana Water Resources Research Center	W75-04035	1
Kentucky Water Resources Research Institute	W75-04036, 04147	2
Maryland Water Resources Research Center	W75-03944, 04037	2
Michigan Institute of Water Research	W75-03852, 04038	2
Missouri Water Resources Research Center	W75-04039 -- 04040 04148 -- 04150	5
Nebraska Water Resources Research Institute	W75-04043 -- 04045	3

Source	Accession Number	Total
B. State Water Resources Research Institute (Cont'd)		
Nevada Center for Water Resources Research	W75-04041	1
New Mexico Water Resources Research Institute	W75-04042	1
New York Water Resources and Marine Sciences Center	W75-03945	1
North Carolina Water Resources Research Institute	W75-04046 -- 04048	3
Ohio Water Resources Center	W75-03853	1
Oregon Water Resources Research Institute	W75-04049	1
Pennsylvania Institute for Research on Land and Water Resources	W75-03946	1
South Carolina Water Resources Research Institute	W75-04050 -- 04051	2
Utah Center for Water Resources Research	W75-03854, 04052	2
Wisconsin Water Resources Center	W75-04053	1
C. Other		
BioSciences Information Service	W75-03909, 03931 03954, 03959 03991, 04011 04013, 04030 04111, 04127 04135, 04264, 04267 04288 04311 -- 04321 04335 04346 -- 04348	29
Commonwealth Scientific and Industrial Research Organization, Australia	W75-03937 -- 03943	7
Effects of Pollutants on Aquatic Life (Katz)	W75-04281 -- 04287	7
Ocean Engineering Information Service (Patents)	W75-03857 -- 03879	23
Office of Water Research and Technology	W75-03855 -- 03856 03947 -- 03949 04031, 04151	7
U. S. Geological Survey	W75-03967 -- 03988	22

☆ U. S. GOVERNMENT PRINTING OFFICE : 1975 582-943/21

CENTERS OF COMPETENCE AND THEIR SUBJECT COVERAGE

- Ground and surface water hydrology at the Illinois State Water Survey and the Water Resources Division of the U.S. Geological Survey, U.S. Department of the Interior.
- Metropolitan water resources planning and management at the Center for Urban and Regional Studies of University of North Carolina.
- Eastern United States water law at the College of Law of the University of Florida.
- Policy models of water resources systems at the Department of Water Resources Engineering of Cornell University.
- Water resources economics at the Water Resources Center of the University of Wisconsin.
- Eutrophication at the Water Resources Center of the University of Wisconsin.
- Water resources of arid lands at the Office of Arid Lands Studies of the University of Arizona.
- Water well construction technology at the National Water Well Association.
- Water-related aspects of nuclear radiation and safety at the Oak Ridge National Laboratory.
- Water resource aspects of the pulp and paper industry at the Institute of Paper Chemistry.

Supported by the Environmental Protection Agency in cooperation with WRSIC

- Effect on water quality of irrigation return flows at the Department of Agricultural Engineering of Colorado State University.
- Agricultural livestock waste at East Central State College, Oklahoma.
- Municipal wastewater treatment technology at the Franklin Institute Research Laboratories.

Subject Fields

1 NATURE OF WATER

2 WATER CYCLE

3 WATER SUPPLY AUGMENTATION AND CONSERVATION

4 WATER QUANTITY MANAGEMENT AND CONTROL

5 WATER QUALITY MANAGEMENT AND PROTECTION

6 WATER RESOURCES PLANNING

7 RESOURCES DATA

8 ENGINEERING WORKS

9 MANPOWER, GRANTS, AND FACILITIES

10 SCIENTIFIC AND TECHNICAL INFORMATION

INDEXES

SUBJECT INDEX

AUTHOR INDEX

ORGANIZATIONAL INDEX

ACCESSION NUMBER INDEX

ABSTRACT SOURCES

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

OFFICIAL BUSINESS

PRINTED MATTER

AN EQUAL OPPORTUNITY EMPLOYER

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE
COM 211

SWRA
XEROX UNIVERSITY MICROFILMS X750630
SERIALS DEPARTMENT
300 NORTH ZEEB ROAD
ANN ARBOR MI 48106

001